Department of Defense
Fiscal Year (FY) 2017 President's Budget Submission

February 2016

Office of the Secretary Of Defense

Defense-Wide Justification Book Volume 3 of 3

Research, Development, Test & Evaluation, Defense-Wide

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Defense-Wide
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

04 Feb 2016

Summary Recap of Budget Activities	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Basic Research	128,936	162,129		162,129	129,571		129,571
Applied Research	135,660	140,878		140,878	158,823		158,823
Advanced Technology Development	833,897	1,082,112	40,000	1,122,112	1,161,401		1,161,401
Advanced Component Development And Prototypes	671,455	1,021,839		1,021,839	1,096,620		1,096,620
System Development And Demonstration	163,816	133,763		133,763	292,419		292,419
Management Support	681,372	681,211		681,211	522,166		522,166
Operational System Development	70,013	57,756		57,756	69,277		69,277
Total Research, Development, Test & Evaluation	2,685,149	3,279,688	40,000	3,319,688	3,430,277		3,430,277
Summary Recap of FYDP Programs							
General Purpose Forces	1,900	1,943		1,943	2,072		2,072
Intelligence and Communications	110,495	90,330		90,330	118,502		118,502
Research and Development	2,533,493	3,144,736	40,000	3,184,736	3,275,319		3,275,319
Training Medical and Other	38,266	42,679		42,679	34,384		34,384
Administration and Associated Activities	995						
Total Research, Development, Test & Evaluation	2,685,149	3,279,688	40,000	3,319,688	3,430,277		3,430,277

Defense-Wide
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

04 Feb 2016

Appropriation	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Office of Secretary of Defense	2,685,149	3,279,688	40,000	3,319,688	3,430,277		3,430,277
Total Research, Development, Test & Evaluation	2,685,149	3,279,688	40,000	3,319,688	3,430,277		3,430,277

Defense-Wide
FY 2017 President's Budget
Exhibit R-1 FY 2017 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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Appropriation: 0400D Research, Development, Test & Eval, DW

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3	0601110D8Z	Basic Research Initiatives	01	41,054	71,940		71,940	36,654		36,654	U
5	0601120D8Z	National Defense Education Program	01	54,619	54,355		54,355	69,345		69,345	U
6	0601228D8Z	Historically Black Colleges and Universities/Minority Institutions	01	33,263	35,834		35,834	23,572		23,572	U
		Basic Research		128,936	162,129		162,129	129,571		129,571	
8	0602000D8Z	Joint Munitions Technology	02	19,491	19,314		19,314	17,745		17,745	U
10	0602230D8Z	Defense Technology Innovation	02					30,000		30,000	U
11	0602234D8Z	Lincoln Laboratory Research Program	02	49,409	50,925		50,925	48,269		48,269	U
12	0602251D8Z	Applied Research for the Advancement of S&T Priorities	02	40,168	48,131		48,131	42,206		42,206	U
16	0602668D8Z	Cyber Security Research	02	17,748	13,701		13,701	12,183		12,183	U
21	0602751D8Z	Software Engineering Institute (SEI) Applied Research	02	8,844	8,807		8,807	8,420		8,420	U
		Applied Research		135,660	140,878		140,878	158,823		158,823	
23	0603000D8Z	Joint Munitions Advanced Technology	03	24,132	25,864		25,864	23,902		23,902	U
24	0603121D8Z	SO/LIC Advanced Development	03	8,587							U
25	0603122D8Z	Combating Terrorism Technology Support	03	99,121	108,030	40,000	148,030	73,002		73,002	U
26	0603133D8Z	Foreign Comparative Testing	03	21,128	24,782		24,782	19,343		19,343	U
33	0603225D8Z	Joint DoD-DoE Munitions Technology Development	03	17,889	18,765		18,765	17,256		17,256	U
38	0603288D8Z	Analytic Assessments	03	13,299	14,645		14,645	12,048		12,048	U
39	0603289D8Z	Advanced Innovative Analysis and Concepts	03	48,760	50,030		50,030	57,020		57,020	U

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Appropriation: 0400D Research, Development, Test & Eval, DW

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41	0603375D8Z	Technology Innovation	03	10,000	25,000		25,000	39,923		39,923	U
43	0603527D8Z	RETRACT LARCH	03		108,430		108,430	181,977		181,977	U
44	0603618D8Z	Joint Electronic Advanced Technology	03	10,757	30,879		30,879	22,030		22,030	U
45	0603648D8Z	Joint Capability Technology Demonstrations	03	116,234	132,258		132,258	148,184		148,184	U
46	0603662D8Z	Networked Communications Capabilities	03		5,967		5,967	9,331		9,331	U
47	0603680D8Z	Defense-Wide Manufacturing Science and Technology Program	03	88,135	156,743		156,743	158,398		158,398	U
49	0603699D8Z	Emerging Capabilities Technology Development	03	68,640	40,949		40,949	49,895		49,895	U
52	0603716D8Z	Strategic Environmental Research Program	03	54,357	55,705		55,705	65,078		65,078	U
54	0603727D8Z	Joint Warfighting Program	03	10,108	4,982		4,982	7,848		7,848	U
60	0603781D8Z	Software Engineering Institute	03	15,198	15,173		15,173	14,264		14,264	U
61	0603826D8Z	Quick Reaction Special Projects	03	55,821	70,320		70,320	74,943		74,943	U
62	0603832D8Z	DoD Modeling and Simulation Management Office	03	2,908							U
63	0603833D8Z	Engineering Science & Technology	03		18,341		18,341	17,659		17,659	U
64	0603941D8Z	Test & Evaluation Science & Technology	03	79,073	91,425		91,425	87,135		87,135	U
65	0604055D8Z	Operational Energy Capability Improvement	03	45,060	41,420		41,420	37,329		37,329	U
66	0303310D8Z	CWMD Systems	03	44,690	42,404		42,404	44,836		44,836	U
		Advanced Technology Development		833,897	1,082,112	40,000	1,122,112	1,161,401		1,161,401	

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Sec
68	0603161D8Z	Nuclear and Conventional Physical Security Equipment RDT&E ADC&P	04	40,088	31,648		31,648	28,498		28,498	U
69	0603600D8Z	WALKOFF	04	98,547	90,387		90,387	89,643		89,643	U
70	0603714D8Z	Advanced Sensors Application Program	04	19,482	15,869		15,869				U
71	0603821D8Z	Acquisition Enterprise Data & Information Services	04					2,136		2,136	U
72	0603851D8Z	Environmental Security Technical Certification Program	04	62,432	52,654		52,654	52,491		52,491	U
90	0603920D8Z	Humanitarian Demining	04	9,930	10,110		10,110	10,007		10,007	U
91	0603923D8Z	Coalition Warfare	04	9,974	10,330		10,330	10,126		10,126	U
92	0604016D8Z	Department of Defense Corrosion Program	04	12,519	6,518		6,518	3,893		3,893	U
94	0604132D8Z	Missile Defeat Project	04					45,000		45,000	U
95	0604250D8Z	Advanced Innovative Technologies	04	170,872	468,881		468,881	844,870		844,870	U
96	0604342D8Z	Defense Technology Offset	04		75,000		75,000				U
97	0604400D8Z	Department of Defense (DoD) Unmanned System Common Development	04	7,574	7,786		7,786	3,320		3,320	U
99	0604682D8Z	Wargaming and Support for Strategic Analysis (SSA)	04					4,000		4,000	U
100	0604775D8Z	Defense Rapid Innovation Program	04	224,910	250,000		250,000				U
113	0605170D8Z	Support to Networks and Information Integration	04	12,477							U
114	0303191D8Z	Joint Electromagnetic Technology (JET) Program	04	2,650	2,656		2,656	2,636		2,636	U
		Advanced Component Development And Prototypes		671,455	1,021,839		1,021,839	1,096,620		1,096,620	

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116	0604161D8Z	Nuclear and Conventional Physical Security Equipment RDT&E SDD	05	7,775	8,783		8,783	10,324		10,324	U
117	0604165D8Z	Prompt Global Strike Capability Development	05	95,588	88,660		88,660	181,303		181,303	U
120	0604771D8Z	Joint Tactical Information Distribution System (JTIDS)	05	19,556	14,257		14,257	16,288		16,288	U
124	0605022D8Z	Defense Exportability Program	05	3,150	3,267		3,267	2,920		2,920	U
125	0605027D8Z	OUSD(C) IT Development Initiatives	05	6,300	4,962		4,962				U
127	0605075D8Z	DCMO Policy and Integration	05	18,682	2,219		2,219				U
130	0605140D8Z	Trusted Foundry	05					69,000		69,000	U
131	0605210D8Z	Defense-Wide Electronic Procurement Capabilities	05	9,227	7,209		7,209	9,881		9,881	U
133	0305304D8Z	DoD Enterprise Energy Information Management (EEIM)	05	3,538	4,406		4,406	2,703		2,703	U
		System Development And Demonstration		163,816	133,763		133,763	292,419		292,419	
134	0604774D8Z	Defense Readiness Reporting System (DRRS)	06	5,605	5,571		5,571	4,678		4,678	U
135	0604875D8Z	Joint Systems Architecture Development	06	2,986	3,076		3,076	4,499		4,499	U
136	0604940D8Z	Central Test and Evaluation Investment Development (CTEIP)	06	234,011	213,668		213,668	219,199		219,199	U
137	0604942D8Z	Assessments and Evaluations	06	15,220	28,618		28,618	28,706		28,706	U
139	0605100D8Z	Joint Mission Environment Test Capability (JMETC)	06	26,736	40,146		40,146	87,080		87,080	U
140	0605104D8Z	Technical Studies, Support and Analysis	06	23,735	24,887		24,887	23,069		23,069	U

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Appropriation: 0400D Research, Development, Test & Eval, DW

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141	0605117D8Z	Foreign Materiel Acquisition and Exploitation	06	46,781							U
143	0605128D8Z	Classified Program USD(P)	06	99,960	115,000		115,000				U
144	0605142D8Z	Systems Engineering	06	43,248	39,581		39,581	32,429		32,429	U
145	0605151D8Z	Studies and Analysis Support - OSD	06	2,645	2,710		2,710	3,797		3,797	U
146	0605161D8Z	Nuclear Matters-Physical Security	06	4,213	5,277		5,277	5,302		5,302	U
147	0605170D8Z	Support to Networks and Information Integration	06	27,012	5,279		5,279	7,246		7,246	U
148	0605200D8Z	General Support to USD (Intelligence)	06	2,846	1,686		1,686	1,874		1,874	U
153	0605502D8Z	Small Business Innovative Research	06	52,627							U
158	0605790D8Z	Small Business Innovation Research (SBIR)/ Small Business Technology Transfer	06	1,631	2,166		2,166	2,187		2,187	U
159	0605798D8Z	Defense Technology Analysis	06	21,357	115,933		115,933	22,650		22,650	U
162	0605804D8Z	Development Test and Evaluation	06	18,833	21,337		21,337	19,541		19,541	U
165	0606100D8Z	Budget and Program Assessments	06	4,030	4,116		4,116	4,014		4,014	U
166	0203345D8Z	Defense Operations Security Initiative (DOSI)	06	1,900	1,943		1,943	2,072		2,072	U
171	0303260D8Z	Defense Military Deception Program Office (DMDPO)	06		971		971	916		916	U
173	0305193D8Z	Cyber Intelligence	06	6,735	6,567		6,567	18,523		18,523	U
175	0804767D8Z	COCOM Exercise Engagement and Training Transformation (CE2T2) - MHA	06	38,266	42,679		42,679	34,384		34,384	U

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(Dollars in Thousands)

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2015 (Base & OCO)	FY 2016 Base Enacted	FY 2016 OCO Enacted	FY 2016 Total Enacted	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Sec
180	0909999D8Z	Financing for Cancelled Account Adjustments	06	995							U
		Management Support		681,372	681,211		681,211	522,166		522,166	
184	0607210D8Z	Industrial Base Analysis and Sustainment Support	07	14,282	22,532		22,532	16,195		16,195	U
185	0607310D8Z	CWMD Systems: Operational Systems Development	07	2,849	1,898		1,898	4,194		4,194	U
202	0303140D8Z	Information Systems Security Program	07	10,933	8,940		8,940	8,876		8,876	U
208	0303260D8Z	Defense Military Deception Program Office (DMDPO)	07	925							U
216	0305125D8Z	Critical Infrastructure Protection (CIP)	07	8,702							U
220	0305186D8Z	Policy R&D Programs	07	7,005	4,175		4,175	6,204		6,204	U
221	0305199D8Z	Net Centricity	07	23,229	18,095		18,095	17,971		17,971	U
230	0305387D8Z	Homeland Defense Technology Transfer Program	07	2,088	2,116		2,116	2,037		2,037	U
236	0307577D8Z	Intelligence Mission Data (IMD)	07					13,800		13,800	U
		Operational System Development		70,013	57,756		57,756	69,277		69,277	
Total Research, Development, Test & Eval, DW				2,685,149	3,279,688	40,000	3,319,688	3,430,277		3,430,277	

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11	02	0602234D8Z	Lincoln Laboratory	Volume 3 - 41
12	02	0602251D8Z	Applied Research for the Advancement of S&T Priorities	Volume 3 - 57
16	02	0602668D8Z	Cyber Security Research	Volume 3 - 63
21	02	0602751D8Z	Software Engineering Institute (SEI) Applied Research	Volume 3 - 75

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25	03	0603122D8Z	Combating Terrorism Technology Support	Volume 3 - 107
26	03	0603133D8Z	Foreign Comparative Testing	Volume 3 - 141
33	03	0603225D8Z	Joint DOD/DOE Munitions Technology Development	Volume 3 - 155
38	03	0603288D8Z	Science and Technology (S&T) Analytic Assessments	Volume 3 - 177
39	03	0603289D8Z	Advanced Innovative Analysis and Concepts	Volume 3 - 185
41	03	0603375D8Z	Technology Innovation	Volume 3 - 193
43	03	0603527D8Z	Retract Larch	Volume 3 - 197
44	03	0603618D8Z	Joint Electronic Advanced Technology	Volume 3 - 199
45	03	0603648D8Z	Joint Capability Technology Demonstration (JCTD)	Volume 3 - 213
46	03	0603662D8Z	Networked Communications Capability	Volume 3 - 233
47	03	0603680D8Z	Defense Wide Manufacturing Science and Technology Program	Volume 3 - 239
49	03	0603699D8Z	Emerging Capabilities Technology Development	Volume 3 - 265
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54	03	0603727D8Z	Joint Warfighting Program	Volume 3 - 291

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61	03	0603826D8Z	Quick Reactions Special Projects (QRSP)	Volume 3 - 303
62	03	0603832D8Z	DoD Modeling and Simulation Management Office	Volume 3 - 337
63	03	0603833D8Z	Engineering Science and Technology (S&T)	Volume 3 - 341
64	03	0603941D8Z	Test and Evaluation/Science and Technology	Volume 3 - 353
65	03	0604055D8Z	Operational Energy Capability Improvement	Volume 3 - 383
66	03	0303310D8Z	Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)	Volume 3 - 395

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69	04	0603600D8Z	WALKOFF	Volume 3 - 451
70	04	0603714D8Z	Advanced Sensors Application Program	Volume 3 - 457
71	04	0603821D8Z	Acquisition Enterprise Data & Information Services	Volume 3 - 463
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94	04	0604132D8Z	Missile Defeat Project	Volume 3 - 509
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96	04	0604342D8Z	Defense Technology Offset	Volume 3 - 545
97	04	0604400D8Z	Department of Defense (DoD) Unmanned Systems Common Development	Volume 3 - 551
99	04	0604682D8Z	Wargaming & Support for Strategic Analysis (SSA)	Volume 3 - 569
100	04	0604775D8Z	Defense Rapid Innovation Program	Volume 3 - 577
113	04	0605170D8Z	Support to Networks and Information Integration	Volume 3 - 585
114	04	0303191D8Z	Joint Electromagnetic Technology (JET) Program	Volume 3 - 591

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135	06	0604875D8Z	Joint Systems Architecture Development	Volume 3 - 759
136	06	0604940D8Z	Central Test and Evaluation Investment Program (CTEIP)	Volume 3 - 767
137	06	0604942D8Z	Assessments & Evaluations	Volume 3 - 779
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145	06	0605151D8Z	Studies and Analysis Support - OSD	Volume 3 - 823
146	06	0605161D8Z	Nuclear Matters	Volume 3 - 827
147	06	0605170D8Z	Support to Networks and Information Integration	Volume 3 - 835
148	06	0605200D8Z	General Support to OUSD(I)	Volume 3 - 847
153	06	0605502D8Z	Small Business Innovation Research/Small Business Technology Transfer (SBIR/ STTR)	Volume 3 - 855
158	06	0605790D8Z	Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)	Volume 3 - 859
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ACRONYM LIST

ACRONYM	DEFINITION
ARDEC	Army Armament Research, Development, and Engineering Center
AMRDEC	Aviation and Missile Research, Development, and Engineering Center
ASD/R&E	Assistant Secretary of Defense for Research and Engineering
ASW	Anti-Submarine Warfare
AT&L	Acquisition Technology and Logistics
C2	Command and Control
C3	Command, Controls, and Communications
C4	Command, Controls, Communications, and Computer
C4I	Command, Controls, Communications, Computer, and Intelligence
C4ISR	Command, Controls, Communications, Computer, Intelligence, Surveillance and Reconnaissance
C4IAS	Command, Controls, Communications, Computer, and Intelligence Automation System
CBRNE	Chemical, Biological, Radiological, Nuclear, and high-yield Explosives
CIED	Counter-Improvised Explosive Device
CND	Computer Network Defense
COCOMs	Combatant Commands
CTTSO	Combating Terrorism Technical Support Office
CWMD	Countering Weapons of Mass Destruction
DARPA	Defense Advanced Research Projects Agency
DOD	Department of Defense
DPPG	Defense Policy and Planning Guidance
DSCS	Defense Satellite Communications System
DTRA	Defense Threat Reduction Agency
DTRMC	Defense Test Resource Management Center
DT&E	Development, Test and Evaluation
EDTC	Engineering and Development Test Center
EMP	Electromagnetic Pulse
EMREP	Electromagnetic Reliability and Effects Predictions
EOD	Explosive Ordnance Disposal
EOD/LIC	Explosive Ordnance Disposal/Low-Intensity Conflict
ESTCP	Environmental Security Technology Certification Program
FATGS	Fuze Area Technology Groups
FCT	Foreign Comparative Testing
FFRDC	FFRDC Federally Funded Research and Development Center
GCC	Global Command and Control

GEF	Guidance for Employment of the Force
GKMC	Global Knowledge Management System
GSA	Global Situational Awareness
GSM	Global System for Mobile Communications
HAMMER	Heated and Mobile Munitions Employing RocketsHANE High Altitude Nuclear Environments
HARP	High Altitude Radiological Phenomenology
HEBX	Hybridized Enhanced Blast Explosive
HEMP	HEMP High Altitude Electro Magnetic Pulse
HBCU/MI	Historically Black Colleges and Universities and Minority Institutions
HDBT	Hard and Deeply Buried Target
HPAC	Hazard Prediction and Assessment Capability
HPCMP	High Performance Computing Modernization Program
HSBC	Human Social Culture Behavior
HTD	Hard Target Defeat
IBRD	Interagency Biological Restoration Demonstration
IED	Improvised Explosive Device
IM	Insensitive Munitions
IMD	Intelligence Mission Data
IMEA	Integrated Munitions Effects Assessment
IOC	Initial Operational Capability
IPODS	Integrated Precision Ordnance Delivery System
ISR	Intelligence, Surveillance, Reconnaissance
ISS	Integrated Sensor System
ISSP	Information Systems Security Program
IWS	Irregular Warfare Support
ITD	Integrated Technology Demonstration
JCIDS	Joint Capabilities Integration and Development System
JCTD	Joint Concept Technology Demonstration
JEM	Joint Effects Model
JFTP	Joint Fuze Technology Program
JIEDDO	Joint Improvised Explosive Device Defeat Organization
JIMTP	Joint Insensitive Munitions Technology Program
JMEWS	Joint Multi-Effects Warhead System
JSAF	Joint Semi-Automated Forces
JUON/JEON	Joint Urgent Operational Needs / Joint Emergent Operational Needs
M&S	Modeling and Simulation
MATGs	Munition Area Technology Groups
MEMS	MEMS - MicroElectro-Mechanical Systems (MEMS)

MIL STD	Military Standard
MRL	MRL - Manufacturing Readiness Level
NDAA	National Defense Authorization Act
NDEP	National Defense Education Program
NCNS	National Center for Nuclear Security
NMCC	National Military Command Center
NNSA	National Nuclear Security Administration
NSSEFF	National Security Science and Engineering Faculty Fellowship
NuCS	Nuclear Capability Services
NWC	Nuclear Weapons Council
NWE	Nuclear Weapon Effects
NWEN	Nuclear Weapon Effects Network
NWEDS	Nuclear Weapons Effects Database System
NWRM	Nuclear Weapons Related Materiel
OCO	Overseas Contingency Operations
OCONUS	Outside the Continental United States
OLED	Organic Light Emitting Diode
OSD	Office of the Secretary of Defense
OSTP	Office of Science and Technology Policy
PDV	Product Demonstration Vehicle
PEO	Program Executive Officers
QDR	Quadrennial Defense Review
R2TD	Rapid Reaction Tunnel Detection
RDT&E	Research Development Test and Evaluation
RadHard	Radiation Hardened
RFIS	Robust Fuzewell Instrumentation System
RHBD	Radiation Hardened by Design
RHM	Radiation Hardened Microelectronics
ROM	Rough Order of Magnitude
S&E	Scientists and Engineers
S&T	Science & Technology
SBIR	Small Business Innovative Research
SCO	Strategic Capabilities Office
SCSP	Special Operations Command Combating Weapons of Mass Destruction-Terrorism Support Program
SMART	Science, Mathematics, and Research for Transformation
SMDC	Space and Missile Development Command
SNL	Sandia National Laboratory
SNM	Special Nuclear Material

SOF	Special Operations Forces
SPE	Source Physics Experiment
SPG	Short Pulse Gamma
SSBR	Strategic Support for Basic Research
STEM	Science, Technology, Engineering, and Mathematics
STTR	Small Business Technology Transfer
TB	Test Bed
TEAMS	Technical Evaluation Assessment and Monitor Site
TNF	Technical Nuclear Forensics
TOA	Total Obligation Authority
TOW	Tube-launched, Optically-tracked, Wireless-guided
TPMM	TPMM Technology Program Management Model
TRAC	Threat Reduction Advisory Committee
TRL	Technology Readiness Level
TSG	Technical Support Group
UAS	Unmanned Aerial Systems
UCP	Unified Command Plan
UGF	Underground Facility
UGT	UGT Underground Test
USFK	U.S. Forces Korea
USG	USG United States Government
USNORTHCOM	U.S. Northern Command
USPACOM	U.S. Pacific Command
USSOCOM	U.S. Special Operations Command
USSTRATCOM	U.S. Strategic Command
UTAS	Underground Targeting and Analysis System
UXO	Unexploded Ordnance
WACS	WMD Aerial Collection System
WCF	West Coast Facility
WEP	Weapon Effects Phenomenology
WESC	Weapon Effects Steering Committee
WMD	Weapons of Mass Destruction
WSMR	White Sands Missile Range

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	41.054	71.940	36.654	-	36.654	40.649	42.988	45.607	46.500	Continuing	Continuing
P010: *Basic Research Initiatives*	-	12.180	33.446	13.548	-	13.548	12.455	12.552	12.804	13.061	Continuing	Continuing
P060: *National Security Science and Engineering Faculty Fellowship (NSSEFF)*	-	28.874	38.494	23.106	-	23.106	28.194	30.436	32.803	33.439	Continuing	Continuing

A. Mission Description and Budget Item Justification

Supporting basic research provides the Department of Defense (DoD) with a deep and broad awareness of current directions in areas of research important to U.S. military capabilities – including physics and the physical sciences, materials science, chemistry and chemical engineering, electrical engineering, mathematics, computer science, mechanical and aerodynamic engineering, ocean sciences, biological sciences, and the social sciences, among others. Basic research sustains scientific and engineering communities as it generates the critical technical underpinnings of DoD capabilities. Basic research allows exploration and discovery, yielding disruptive non-incremental advances that can improve or radically change military capabilities, strategy, and operations.

The Basic Research Initiatives program element (PE) supports the defense basic research enterprise in three critical areas: Strategic Support for Basic Research (SSBR), the Minerva Research Initiative, and the National Security Science and Engineering Faculty Fellowship (NSSEFF) program.

SSBR supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering's (ASD(R&E)) strategic plan for defense basic research. This plan defines specific and quantifiable actions to help create conditions for defense basic research investments capable of producing high-payoff, transformative scientific breakthroughs for DoD. SSBR initiatives support the five aims of: (1) providing scientific leadership; (2) attracting the Nation's best Scientists and Engineers (S&Es); (3) ensuring the coherence and balance of the Basic Research portfolio; (4) fostering connections between DoD performers and DoD; and (5) improving the efficiency of the defense research business environment.

The Minerva Research Initiative, a department-wide basic research program in the social sciences directed by the Office of the Secretary of Defense (OSD) and executed by the Services, seeks to build fundamental understanding of the sources of present and future conflict. It is one of the Nation's only social science basic research programs in support of national security (especially funding field research). Deeper understanding of the social and cultural environments, where threats such as radicalization and regional instabilities develop, supports more effective strategic and operational policy decisions. Minerva program priorities are consistent with the goals set forth in the 2014 Quadrennial Defense Review (QDR), informing DoD efforts to effectively build security globally, and are updated annually according to inputs from across the defense enterprise.

The NSSEFF program supports world-class researchers in scientific areas of critical importance to DoD and ensures the cultivation of exceptional talent. Fellows' work spans a broad set of emerging scientific areas with transformative potential. The NSSEFF program is a key resource to the entire department that fosters close

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*

connections between academia and the entire DoD science and engineering enterprise, a primary goal of SSBR efforts. Fellows provide DoD the deep scientific expertise from today's leading research universities and collaborate with DoD scientists and engineers.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	44.500	42.022	39.011	-	39.011
Current President's Budget	41.054	71.940	36.654	-	36.654
Total Adjustments	-3.446	29.918	-2.357	-	-2.357
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	30.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.429	-			
• Realignment for Higher Priority Programs	-	-	-2.073	-	-2.073
• FY15 Reprog. for Cancelled Account	-0.017	-	-	-	-
• Other Reprogrammings	-2.000	-	-	-	-
• FFRDC Reduction	-	-0.082	-	-	-
• Economic Assumptions	-	-	-0.284	-	-0.284

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / *Basic Research Initiatives*	Project (Number/Name) P010 / *Basic Research Initiatives*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P010: *Basic Research Initiatives*	-	12.180	33.446	13.548	-	13.548	12.455	12.552	12.804	13.061	Continuing	Continuing

A. Mission Description and Budget Item Justification

Supporting basic research provides the Department of Defense (DoD) with a deep and broad awareness of current directions in areas of research important to U.S. military capabilities – including physics and the physical sciences, materials science, chemistry and chemical engineering, electrical engineering, mathematics, computer science, mechanical and aerodynamic engineering, ocean sciences, biological sciences, and the social sciences, among others. Basic research sustains scientific and engineering communities as it generates the critical technical underpinnings of DoD capabilities. Basic research allows exploration and discovery, yielding disruptive non-incremental advances that can improve or radically change military capabilities, strategies, and operations.

Strategic Support for Basic Research (SSBR) supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering's (ASD(R&E)) strategic plan for defense basic research. This plan defines specific and quantifiable actions to help create conditions for defense basic research investments capable of producing high-payoff, transformative scientific breakthroughs for DoD. SSBR initiatives support the five aims of: (1) providing scientific leadership; (2) attracting the Nation's best Scientists and Engineers (S&Es); (3) ensuring the coherence and balance of the Basic Research portfolio; (4) fostering connections between DoD performers and DoD; and (5) improving the efficiency of the defense research business environment.

The Minerva Research Initiative, a department-wide basic research program in the social sciences directed by the Office of the Secretary of Defense (OSD) and executed by the Services, seeks to build fundamental understanding of the sources of present and future conflict. It is one of the Nation's only social science basic research programs in support of national security (especially funding field research). Deeper understanding of the social and cultural environments, where threats such as radicalization and regional instabilities develop, supports more effective strategic and operational policy decisions. Minerva program priorities are consistent with the goals set forth in the 2014 Quadrennial Defense Review (QDR), informing DoD efforts to effectively build security globally, and are updated annually according to inputs from across the defense enterprise.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Strategic Support for Basic Research (SSBR)	2.000	11.918	2.000
Description: The SSBR program funds actively creates conditions for defense basic research investments capable of producing high-payoff, transformative scientific breakthroughs for DoD. The SSBR initiatives support the five aims of: (1) providing scientific leadership; (2) attracting the Nation's best scientists and engineers; (3) ensuring the coherence and balance of the Basic Research portfolio; (4) fostering connections between DoD performers and DoD; and (5) improving the efficiency of the defense research business environment. ***FY 2015 Accomplishments:*** Used the input developed from the FY 2014 Request for Information (RFI) to inform topic selection. Selected topics for four workshops to provide the status of rapid research progress and evolving world leadership in these fields. The four topics selected were Machine Intelligence, Visual Common Sense, Compressive Sensing, and Power and Energy. Two of the four workshops			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*	**Project (Number/Name)** P010 / *Basic Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
were conducted in early FY 2016. Initiated studies of how past DoD investments and high priority basic research have led to advances in new technologies and new capabilities for the Nation. Continued to analyze university-related business practices for improvement and efficiency. Continued support for scientific expertise to oversee science and engineering initiatives. ***FY 2016 Plans:*** Continue the series of workshops for scientific situational awareness that were planned in FY 2014 and FY 2015. Convene National research leaders to provide expert perspectives on potential breakthroughs and barriers of advancement in rapidly evolving fields of basic research. Initiate another series of workshops by sponsoring a Request for Information (RFI) to inform topic selection for the next set of workshops. Continue external portfolio review and studies of how past DoD investments and high priority basic research has led to advances in new technologies and new capabilities for the Nation. Analyze basic research portfolio investment. Continue to analyze university-related business practices for improvement and efficiency. Continue support for scientific expertise to oversee science and engineering initiatives. New in FY 2016 are two SSBR pilot programs to strengthen defense basic research both institutionally and internationally. The first pilot will enhance collaboration with the international scientific community –- as recommended by the Defense Science Board in its 2011 study –- by supporting international exchanges for laboratory-based scientists and their allied nation counterparts. With the goals of reinvigorating DoD laboratories as facilities of basic research and enhancing connectivity between the academic and defense laboratory communities, DoD will launch a second “Laboratory University Collaboration Initiative” (LUCI) pilot augmenting the flagship Multidisciplinary University Research Initiative (MURI) program (already overseen by ASD(R&E)). Much like the LUCI pilot planned for the NSSEFF program, the MURI LUCI pilot will support collaborative MURI projects between DoD and university researchers in areas of scientific or technological importance to DoD, while also expanding the research capabilities of DoD laboratories. ***FY 2017 Plans:*** Continue the series of workshops for scientific situational awareness that were planned in previous Fiscal Years. Convene National research leaders to provide expert perspectives on potential breakthroughs and barriers of advancement in rapidly evolving fields of basic research. Continue studies of how past DoD investments and high priority basic research has led to advances in new technologies and new capabilities for the Nation. Continue to analyze university-related business practices for improvement and efficiency. Continue support for scientific expertise to oversee science and engineering initiatives.			
Title: Minerva Research Initiative ***Description:*** The Minerva Research Initiative includes two primary components: (1) a university-based social science basic research grant program; and (2) Research for Defense Education Faculty (R-DEF) at the professional military education (PME) institutions. Both components contribute to Minerva goals of revitalizing connections between DoD and academic social science communities, and building critical cultural and foreign area knowledge and insights in topics ranging from the mechanisms of	10.180	21.528	11.548

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*	**Project (Number/Name)** P010 / *Basic Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

radicalization to geopolitical power projection strategies in a multipolar world. This deeper understanding will provide a more informed basis to shape doctrine, analysis, and other strategic and operational decisions made by war planners and warfighters.

FY 2015 Accomplishments:

Inputs from the Service leadership, Defense Advanced Research Project Agency (DARPA), Joint Staff, Intelligence Community, and others in the defense community informed updated topics in the FY 2015 Broad Agency Announcement (BAA). A total of 297 initial submissions were received, and 11 new multi-year university-led research grants were awarded in Fall 2015.

Researchers briefed the United Nations Security Council (UNSC), Combatant Commanders, and the Vice Chairman of Joint Chiefs of Staff (VCJCS). The Minerva program supported an analysis requested by the commander of Special Operations Central Command (SOCCENT) on (1) understanding the appeal of Islamic State of Iraq and the Levant (ISIL), and (2) anticipating regional dynamics three to five years out, especially in terms of pathways toward (and key indicators of) regional fragmentation. Program staff and funded scholars have supported these and other assessments through core research activities in critical areas, contributing subject matter expertise in “Virtual Think Tanks” meant to generate rich understanding of potential futures in the Middle East; and by direct participation in unclassified simulation exercises based on scenarios developed by the Intelligence Community.

The R-DEF program expanded at participating PMEs and military service academies, further strengthening DoD-internal social science capabilities by offering new research opportunities for teaching faculty through research support, research travel funding, and course buyouts. Furthermore, RDEF support enabled academic-government exchange opportunities, new curriculum development, and research-informed tabletop exercises.

FY 2016 Plans:

Heightened challenges related to global terrorism and the Islamic State of Iraq and Syria (ISIL) indicate the need for serious intellectual investment of the sources of conflict and cooperation from the ground up. Minerva is one of the only funders of fieldwork-based security research, and plans a one-time ramp up of these investments in response to emerging national needs and in collaboration with global allies. The FY 2016 call for proposals will emphasize field-based scientific research conducted in conflict areas and other locales pertinent to national security. Technical and logistical program support will enable safe and ethical research in regions involving complex security challenges.

In addition to new investments, the Minerva program will: Continue its support of ongoing university-led research initiatives; Maintain support of R-DEF program at defense education institutions; Continue active engagement providing subject matter expertise to quick-turn studies requested by the operational community; and continue building policy and operational community

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*	**Project (Number/Name)** P010 / *Basic Research Initiatives*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
connections to ongoing Minerva efforts, in order to effectively connect new social science insights and methods to current and future defense leadership, to inform tomorrow's key security decisions. ***FY 2017 Plans:*** Continue ongoing, and start new, university-led research initiatives, with priorities shaped by defense needs. Maintain support of R-DEF program at defense education institutions. Continue active engagement providing subject matter expertise to quick-turn studies requested by the operational community. Continue building policy and operational community connections to ongoing Minerva efforts, in order to effectively connect new social science insights and methods to current and future defense leadership, to inform tomorrow's key security decisions.			
Accomplishments/Planned Programs Subtotals	12.180	33.446	13.548

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / *Basic Research Initiatives*	Project (Number/Name) P060 / *National Security Science and Engineering Faculty Fellowship (NSSEFF)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P060: *National Security Science and Engineering Faculty Fellowship (NSSEFF)*	-	28.874	38.494	23.106	-	23.106	28.194	30.436	32.803	33.439	Continuing	Continuing

A. Mission Description and Budget Item Justification

The NSSEFF program supports world-class researchers in scientific areas of critical importance to DoD and ensures the cultivation of exceptional talent. Fellows' work spans a broad set of emerging scientific areas with transformative potential. The NSSEFF program is a key resource to the entire department that fosters close connections between academia and the entire DoD science and engineering enterprise, a primary goal of SSBR efforts. Fellows provide DoD the deep scientific expertise from today's leading research universities and collaborate with DoD scientists and engineers. This program actively engages and coordinates basic research across the department.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: National Security Science and Engineering Faculty Fellowship (NSSEFF)	28.874	38.494	23.106

Description: NSSEFF ensures that DoD has a research portfolio that supports the foremost creative, innovative, and productive university researchers. The objectives of the program are to: (1) support scientific research that may lead to extraordinary outcomes; (2) educate and train outstanding student and post-doctoral researchers for the defense and national security workforce; (3) foster long-term relationships between outstanding university researchers and the DoD; (4) familiarize select university researchers and their students with DoD's current and future challenges; and (5) increase the number of exceptionally talented technical experts that are contributing to DoD's mission.

FY 2015 Accomplishments:

Continued support for ten current NSSEFF Fellows. Reviewed and updated program topic areas (adding "Manufacturing Science"), eligibility, review process, and selection criteria based on the inputs from Service representatives on the steering committee. Solicited for two new classes of NSSEFF Fellows. Out of 165 initial responses for the 2015 Class, seven new fellows were selected in Summer 2015. For the second solicitation, 185 initial responses were received, and 30 full proposals were invited. The selection of 2016 Class (ten new fellows) will be completed in Spring 2016. Organized and conducted the first NSSEFF-DoD orientation event including DoD laboratory tours. Used this venue to identify and facilitate new connections between new Fellows and DoD scientists and engineers including the NSSEFF Steering Committee.

FY 2016 Plans:

Continue support for 27 current NSSEFF Fellows. Review and update program topic areas. Solicit for a new class of NSSEFF Fellows. Organize and conduct a NSSEFF-DoD Spring meeting at Army Research Laboratory at Adelphi including DoD laboratory tours. Use this venue to identify and facilitate new connections between new Fellows and DoD scientists and

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601110D8Z / *Basic Research Initiatives*	**Project (Number/Name)** P060 / *National Security Science and Engineering Faculty Fellowship (NSSEFF)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
engineers, including the NSSEFF Steering Committee. Organize and conduct a program review and report on Fellows' progress. To enhance connectivity between the academic and defense laboratory communities, DoD will launch a laboratory-wide "Laboratory University Collaboration Initiative" (LUCI) pilot augmenting the NSSEFF program to, support collaborative research projects between DoD researchers and NSSEFF Fellows in areas of scientific or technological importance to DoD, and while also expanding the research capabilities of DoD Labs. Launch a pilot I-Corps competition that aims to accelerate commercialization of research insights, either into industry or into DoD programs of record, of basic research innovations of interest to DoD (Pub. L. 113–66, div. A, title XVI, §1603). ***FY 2017 Plans:*** Continue support for 40 current NSSEFF Fellows and DoD collaborative research partners. Review and update program topic areas. Solicit for a new class of NSSEFF Fellows. Organize and conduct NSSEFF-DoD Spring meeting including DoD laboratory tours. Use this venue to identify and facilitate new connections between new Fellows and DoD scientists and engineers, including the NSSEFF Steering Committee. Organize and conduct a program review and report on Fellows' progress. Organize and conduct LUCI competition and selection for collaborative research projects between DoD researchers and NSSEFF Fellows in areas of scientific or technological importance to DoD. Organize DoD I-Corps competition to select projects that will accelerate commercialization, either into industry or into DoD programs of record, of basic research innovations of interest to DoD.			
Accomplishments/Planned Programs Subtotals	28.874	38.494	23.106

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	54.619	54.355	69.345	-	69.345	113.084	116.158	116.848	117.895	Continuing	Continuing
P120: *National Defense Education Program (NDEP)*	-	54.619	54.355	69.345	-	69.345	113.084	116.158	116.848	117.895	Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Defense Education Program (NDEP) ensures the Department of Defense (DoD) will have access to high-quality science, technology, engineering, and mathematics (STEM) personnel vital to national defense now and in the future. NDEP's portfolio provides a pathway to the best and the brightest minds through a continuum of DoD workforce development approaches, which include: (1) increasing STEM proficiency in the Nation's talent pool by improving the capacity to address ever-changing future Defense workforce needs; (2) shaping the Department as a STEM workplace of choice for scientists and engineers through public communications and outreach; (3) leading the Departmental STEM strategic efforts and coordinating STEM efforts in alignment with the workforce and mission requirements; and (4) identifying approaches for innovative solutions in support of the Nation's current and future defense challenges.

NDEP aligns to the DoD Science and Technology (S&T) priorities and is coordinated with the Historically Black Colleges and Universities and Minority Institutions (HBCU/MIs) program. It is synchronized with the Federal Five-Year STEM Education Strategic Plan, the DoD STEM Strategic Plan, the DoD Strategic Workforce Plan, and the DoD Agency Strategic Plan. NDEP components engage in assessment and evaluation as required by the Office of Management and Budget and the Government Accountability Office.

Science, Mathematics, and Research for Transformation (SMART) awards highly competitive scholarships-for-service to undergraduate and graduate students in 19 STEM academic disciplines, and moves graduates directly into DoD's workforce following graduation. As part of the SMART experience, scholars engage in internships that allow for hands-on research and work experiences in DoD facilities, thereby enhancing their educational experience. Since its inception as a pilot program in FY 2005, SMART has awarded approximately 1,800 students from bachelor to doctoral levels and, to date, approximately 950 have completed program studies and are currently employed in the DoD workforce. SMART ensures that DoD has a steady infusion of high-quality technical talent, prepared in areas of critical importance to DoD, ready to apply their technical knowledge, skills, and abilities to fulfill DoD's mission.

STEM Education and Outreach fosters conditions for STEM activities to support and cultivate STEM talent to build a future force that is representative of the nation's diverse population, and reaches underserved populations to meet national defense needs and future defense challenges. Initiatives include investing, promoting and participating in national-level STEM programs and initiatives, and providing STEM authentic hands-on experiences for students and teachers across the nation.

STEM Operations manages activities to implement the Department's strategic plan for STEM education and outreach. STEM Operations provides the necessary program management and oversight, research studies support, and official responses to Congressional and non-Congressional inquiries. STEM Operations develops and maintains systems and standards to support STEM policy implementation, oversight, and assessment. Other STEM Operations activities include providing support to STEM education and outreach programs, implementing the Communications Plan, and collaborating across the Federal government and public domain through inter-agency and inter-departmental working groups, and partnerships.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*

Section 233 of the National Defense Authorization Act (NDAA) for FY 2015, and the Consolidated and Further Continuing Appropriations Act, 2015, directed the Secretary of the Defense to establish a Pilot Program to enhance the preparation of dependents of members of the armed forces for Careers in STEM (Military Child Pilot Program) and to provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled. In FY 2016, the Military Child Pilot Program will continue to receive support; this will continue through FY 2021, in accordance with legislative direction.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	58.405	49.453	49.398	-	49.398
Current President's Budget	54.619	54.355	69.345	-	69.345
Total Adjustments	-3.786	4.902	19.947	-	19.947
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.764	-			
• Military Child Pilot Program	-	-	20.375	-	20.375
• FY15 Reprog. for Cancelled Account	-0.022	-	-	-	-
• Other Reprogrammings	-2.000	-	-	-	-
• FFRDC Reduction	-	-0.098	-	-	-
• Economic Assupmtions	-	-	-0.428	-	-0.428

Change Summary Explanation

Change in FY 2017 reflects program increase for the Military Child Pilot Program.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense											Date: February 2016	
Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name) PE 0601120D8Z / *National Defense Education Program (NDEP)*				Project (Number/Name) P120 / *National Defense Education Program (NDEP)*			
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
P120: *National Defense Education Program (NDEP)*	-	54.619	54.355	69.345	-	69.345	113.084	116.158	116.848	117.895	Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Defense Education Program (NDEP) ensures the Department of Defense (DoD) will have access to high-quality science, technology, engineering, and mathematics (STEM) personnel vital to national defense now and in the future. NDEP's portfolio provides a pathway to the best and the brightest minds through a continuum of DoD workforce development approaches, which include: (1) increasing STEM proficiency in the Nation's talent pool by improving the capacity to address ever-changing future Defense workforce needs; (2) shaping the Department as a STEM workplace of choice for scientists and engineers through public communications and outreach; (3) leading the Departmental STEM strategic efforts and coordinating STEM efforts in alignment with the workforce and mission requirements; and (4) identifying approaches for innovative solutions in support of the Nation's current and future defense challenges.

NDEP aligns to the DoD Science and Technology (S&T) priorities and is coordinated with the Historically Black Colleges and Universities and Minority Institutions (HBCU/MIs) program. It is synchronized with the Federal Five-Year STEM Education Strategic Plan, the DoD STEM Strategic Plan, the DoD Strategic Workforce Plan, and the DoD Agency Strategic Plan. NDEP components engage in assessment and evaluation as required by the Office of Management and Budget and the Government Accountability Office.

Science, Mathematics, and Research for Transformation (SMART) awards highly competitive scholarships-for-service to undergraduate and graduate students in 19 STEM academic disciplines, and moves graduates directly into DoD's workforce following graduation. As part of the SMART experience, scholars engage in internships that allow for hands-on research and work experiences in DoD facilities, thereby enhancing their educational experience. Since its inception as a pilot program in FY 2005, SMART has awarded approximately 1,800 students from bachelor to doctoral levels and, to date, approximately 950 have completed program studies and are currently employed in the DoD workforce. SMART ensures that DoD has a steady infusion of high-quality technical talent, prepared in areas of critical importance to DoD, ready to apply their technical knowledge, skills, and abilities to fulfill DoD's mission.

STEM Education and Outreach fosters conditions for STEM activities to support and cultivate STEM talent to build a future force that is representative of the nation's diverse population and reaches underserved populations to meet the national defense needs and future defense challenges. Initiatives include investing, promoting and participating in national-level STEM programs and initiatives, and providing STEM authentic hands-on experiences for students and teachers across the nation.

STEM Operations manages activities to implement the Department's strategic plan for STEM education and outreach. STEM Operations provides the necessary program management and oversight, research studies support, and official responses to Congressional and non-Congressional inquiries. STEM Operations develops and maintains systems and standards to support STEM policy implementation, oversight, and assessment. Other STEM Operations activities include providing support to STEM education and outreach programs, implementing the Communications Plan, and collaborating across the Federal government and public domain through inter-agency and inter-departmental working groups, and partnerships.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

Section 233 of the National Defense Authorization Act (NDAA) for FY 2015, and the Consolidated and Further Continuing Appropriations Act, 2015, directed the Secretary of the Defense to establish a Pilot Program to enhance the preparation of dependents of members of the Armed Forces for careers in STEM (Military Child Pilot Program) and to provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled. In FY 2016, the Military Child Pilot Program will continue to receive support; this will continue through FY 2021, in accordance with legislative direction.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Science, Mathematics, and Research for Transformation (SMART) Defense Education Program	37.802	40.000	53.571

Description: SMART is a scholarship-for-service program that provides support to high performing U.S. graduate and undergraduate students in 19 academic science, technology, engineering, and mathematics (STEM) disciplines identified as areas of future workforce needed by DoD.

The disciplines align with the Department's Science and Technology (S&T) priorities and emerging scientific research areas. The disciplines include: Aeronautical and Astronautical Engineering; Biosciences; Chemical Engineering; Chemistry; Civil Engineering; Cognitive, Neural, and Behavioral Sciences; Computer Science; Electrical Engineering; Geosciences; Industrial and Systems Engineering; Information Sciences; Materials Science and Engineering; Mathematics; Mechanical Engineering; Naval Architecture and Ocean Engineering; Nuclear Engineering; Oceanography; Operations Research; and Physics. Upon completion of their degree, students fulfill a service commitment to DoD on a one-to-one payback per year of education funded. In part, SMART's success is measured by participants that choose to remain in the DoD workforce beyond their required service commitment. A total of 572 participants have successfully completed the program through their DoD commitment; 77 percent of those participants are still employed by DoD.

Oversight of the SMART program falls under the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)). Two types of individuals participate in the program: (1) retention scholars who are current DoD employees; and (2) recruitment scholars who are college students enrolled in undergraduate and graduate programs, and represent new talent for the Department. Internships provide SMART scholars with an opportunity to engage in hands-on research, and work experiences in defense laboratories, thereby enhancing their educational experience.

Since FY 2005, approximately 1,800 students have participated in the SMART program at approximately 160 sponsoring facilities. As of August 2014, approximately 950 SMART scholars have transitioned into the service commitment phase. To date, these scholars have transitioned as civilian employees into the Air Force, Army, Navy, and other DoD components.

FY 2015 Accomplishments:
• Developed a SMART DoD Instruction (DoDI) in accordance with Directive Type Memorandum (DTM) 13-007 which is currently in the Issuance Portal.
• Began transitioning the SMART program execution to the Services with Navy as the Lead Service.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Continued to examine the effectiveness of efforts to increase the number of eligible applicants from underrepresented groups such as women, minorities, veterans, and persons with disabilities. • Encouraged SMART participation from Historically Black Colleges and Universities and Minority Institutions (HBCU/MIs) and underrepresented groups. • Continued to assess SMART mentoring and workforce development initiatives for current participants and the effectiveness of the transition process. • Transitioned approximately 144 participants into the DoD workforce. • Increased the number of candidate spots and selected new participants based on available funding. • Documented effectiveness of SMART program with metrics such as: (1) percentage of SMART scholars retained post-service commitment; and (2) percentage of SMART participants enrolled at HBCU/MIs. ***FY 2016 Plans:*** • Provide oversight of the execution of the SMART program, per SMART DoDI. • Fully transition the SMART program execution to the Services. • Assess the SMART scholar inception process into DoD facilities and laboratories. ***FY 2017 Plans:*** • Increase new SMART awards to better meet DoD STEM workforce requirements. • Provide oversight of the SMART program, per SMART DoDI. • Continue assessment of the SMART scholar inception process into DoD facilities and laboratories.			
Title: Pilot Program to Enhance the Preparation of Dependents of Members of the Armed Forces for Careers in STEM (Military Child Pilot Program) ***Description:*** The Military Child Pilot Program was established by the FY 2015 National Defense Authorization Act (NDAA), Section 233. The objectives are to enhance the preparation of dependents of members of the armed forces for careers in STEM and to provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled. The Department's methodology includes: (1) providing support to the National Math and Science Initiative (NMSI) program in collaboration with the DoD Education Activity (DoDEA) to expand the number of covered schools to support the national goal; and (2) coordinating with the DoD components, Federal and local government partners, and private sector organizations to compliment the NMSI program. ***FY 2015 Accomplishments:*** • Established a Department-wide, coordinated effort, to create, implement, and assess the pilot program in accordance with the FY 2015 NDAA and the Consolidated and Further Continuing Appropriations Act of 2015.	13.000	8.889	11.111

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Established outcome-based metrics and internal and external assessments to evaluate the merits and benefits of activities conducted under the pilot program with respect to the needs of the Department. This was done in conjunction with DoDEA. • Strengthened partnership with DoDEA and NMSI, supporting approximately 150 covered schools. • Strengthened partnership with the U.S. Department of Education such that DoD may be able to leverage their assessment expertise as related to educational programs as a method of external assessment of the program. • Developed an initial white paper describing the overarching approach to program implementation. • Provided support for the National Math and Science Initiative's College Readiness Program for Military Families event. ***FY 2016 Plans:*** • Continue implementation and assessment of a pilot program with DoDEA and NMSI in preparation for preliminary report due December FY 2016. • Implement and assess a Department-wide pilot program in coordination with the DoD components, Federal and local government partners, and private sector organizations. • Expand access for military-connected children to attend classes in STEM, supporting the national goal of 200 covered schools by April 2016. • Implement activities to improve the quality of STEM educational and training opportunities for students and teachers, including the development and improvement of curricula. • Expand focus of the program to provide activities that engage and fill gaps in STEM education for overseas students. ***FY 2017 Plans:*** • Continue implementation and assessment of a pilot program. • Continue to expand access for military-connected children to attend classes in STEM, supporting the national goal. • Implement activities to improve the quality of STEM educational and training opportunities for students and teachers, including the development and improvement of curricula. • Submit to the Committees on Armed Services of the U.S. Senate and the House of Representatives a progress report on activities carried out under the pilot program.			
Title: STEM Education and Outreach	2.238	2.133	1.330
Description: STEM Education and Outreach fosters conditions for STEM activities to support and cultivate STEM talent to build a future force that is representative of the nation's diverse population and reaches underserved populations to meet national defense needs and future defense challenges. Initiatives include investing, promoting and participating in national-level STEM programs and initiatives, and providing STEM authentic hands-on experiences for students and teachers across the nation. ***FY 2015 Accomplishments:*** • Provided authentic hands-on experiences to a total of 17,452 students and 1,645 teachers across 905 different schools.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Participated in White House Office of Science and Technology Policy activities. • Participated in the Federal Co-STEM Interagency Working Group executing Federal objectives in STEM. • Initiated DoD STEM Communications Campaign. • Provided support and coordinated Departmental participation in local and national STEM events. ***FY 2016 Plans:*** • Increase FY 2015 NDEP Education and Outreach numbers to provide authentic hands-on experiences to students and teachers at various schools. • Lead and participate in inter- and intra-departmental collaboration with program partners to achieve Federal and DoD STEM objectives. • Provide support to STEM education and outreach programs. • Implement the Department's STEM Strategic Plan and Communications Plan. ***FY 2017 Plans:*** • Increase, evaluate, and improve FY 2016 NDEP Education and Outreach numbers to provide authentic hands-on experiences to students and teachers. • Continue participation in inter- and intra-departmental collaboration with program partners to achieve Federal and DoD STEM objectives. • Continue providing support to STEM education and outreach programs. • Continue implementation of the Department's STEM Strategic Plan and Communications Plan.			
Title: STEM Operations	1.579	3.333	3.333
Description: STEM Operations manages activities to implement the Department's strategic plan for STEM education and outreach. STEM Operations provides the necessary program management and oversight, research studies support, and official responses to Congressional and non-Congressional inquiries. STEM Operations develops and maintains systems and standards to support STEM education and outreach programs, implementing the Communications Plan, and collaborating across the Federal government and public domain through inter-agency and inter-departmental working groups, and partnerships. ***FY 2015 Accomplishments:*** • Updated the Department's STEM Education and Outreach Strategic Plan. • Updated the DoD STEM Executive Board of Directors Charter. • Restructured STEM Board of Directors Working Group Processes and Procedures. • Developed the DoD STEM Communications Plan. • Established the DoD STEM Advocate of the Quarter Program. • Developed Department of Defense STEM Instruction (DoDI) and informally coordinated with DoD STEM Stakeholders.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Document the effectiveness of the DoD STEM programs through the Institute for Defense Analysis (IDA) evaluations, in accordance with Better Buying Power 3.0. ***FY 2016 Plans:*** • Continue program management and oversight, studies support, and responses to Congressional inquiries and other reports. • Develop and/or maintain systems and standards to support STEM policy implementation, oversight, and assessment. • Implement the DoD STEM Advocate of the Quarter Program. • Enhance assessment and evaluation standards to support investment decisions. • Implement the Communications Plan. • Complete the report for effectiveness of the DoD STEM programs, in accordance with Better Buying Power 3.0. • Implement policy, assign responsibilities, and provide policy guidance including the STEM Instruction and legislative proposals. ***FY 2017 Plans:*** • Continue program management and oversight, studies support, and responses to Congressional inquiries and other reports. • Develop and/or maintain systems and standards to support STEM policy implementation, oversight, and assessment. • Enhance assessment and evaluation standards to support investment decisions. • Continue implementing STEM Advocate of the Quarter Program awards. • Continue implementing Communications Plan. • Implement policy, assign responsibilities, and provide policy guidance including the STEM Instruction and legislative proposals.			
Accomplishments/Planned Programs Subtotals	54.619	54.355	69.345

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- The increase in the number of SMART scholars who are transitioned into the DoD workforce.
- The number of SMART scholars who are retained by DoD post-service commitment.
- The number of eligible SMART applicants from underrepresented groups, including HBCU/MIs.
- The number of SMART application reviewers from HBCU/MIs.
- Develop program to increase access for military-connected children to attend classes in STEM at covered schools that service military families.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601120D8Z / *National Defense Education Program (NDEP)*	**Project (Number/Name)** P120 / *National Defense Education Program (NDEP)*

- The number of covered schools impacted by the Military Child Pilot Program.
- The number of teachers trained through the Military Child Pilot Program.
- Matriculation of participants into college.
- Participation by underserved populations; and, where applicable, course completions and credentials received.
- Improvements in student educational assessments.
- Infrastructure development and matching efforts by educational institutions or school districts.
- Matching efforts by Component agency and alignment with DoD workforce needs.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601228D8Z / *Historically Black Colleges and Universities and Minority Institutions*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	33.263	35.834	23.572	-	23.572	25.888	30.613	31.036	31.646	Continuing	Continuing
P448: *Historically Black Colleges and Universities and Minority Institutions*	-	33.263	35.834	23.572	-	23.572	25.888	30.613	31.036	31.646	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) program provides support in fields of science and engineering that are important to national defense. The Department of Defense (DoD) HBCU/MI Program encourages participation of small minority schools, as well as, large minority research institutions. This competitive program provides support through grants or contracts for research, education assistance, instrumentation purchases, and technical assistance as described below.

• Research. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and experimental activities. Collaborative research allows university professors to work directly with military laboratories or other universities.

• Education. Education assistance funds are used by minority institutions to strengthen their academic programs in science, technology, engineering, and mathematics (STEM), thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields. These grants provide equipment, scholarships, cooperative work/study opportunities, visiting faculty programs, summer intern programs, and a variety of other enhancements designed to support students, and to encourage them to pursue careers in STEM.

• Instrumentation purchases. The program allows universities to purchase basic laboratory equipment for research and education program enhancements to highly sophisticated research instruments, such as lasers and spectrometers.

• Technical assistance. The funds are used to design programs that enhance the ability of minority institutions to successfully compete for future Defense funding. The objective is to assist the HBCU/MI community in areas such as proposal writing and administration of grants and contracts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601228D8Z / *Historically Black Colleges and Universities and Minority Institutions*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	34.412	25.834	25.388	-	25.388
Current President's Budget	33.263	35.834	23.572	-	23.572
Total Adjustments	-1.149	10.000	-1.816	-	-1.816
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.136	-			
• Realignment for Higher Priority Programs	-	-	-1.634	-	-1.634
• FY15 Reprog. for Cancelled Account	-0.013	-	-	-	-
• Economic Assumptions	-	-	-0.182	-	-0.182

Change Summary Explanation

FY 2017 internal realignment reflects funding changes for higher Departmental priorities and requirements. As a result, the number of grant awards will be reduced by three in FY 2017.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601228D8Z / *Historically Black Colleges and Universities and Minority Institutions*	**Project (Number/Name)** P448 / *Historically Black Colleges and Universities and Minority Institutions*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P448: *Historically Black Colleges and Universities and Minority Institutions*	-	33.263	35.834	23.572	-	23.572	25.888	30.613	31.036	31.646	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) program provides support in fields of science and engineering that are important to national defense. The Department of Defense (DoD) HBCU/MI Program encourages participation of small minority schools as well as large minority research institutions. This competitive program provides support through grants or contracts for research, education assistance, instrumentation purchases, and technical assistance as described below.

• Research. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and experimental activities. Collaborative research allows university professors to work directly with DoD laboratories or other universities.

• Education. Education assistance funds are used by minority institutions to strengthen their academic programs in science, technology, engineering, and mathematics (STEM), thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields. These grants provide equipment, scholarships, cooperative work/study opportunities, visiting faculty programs, summer intern programs, and a variety of other enhancements designed to support students, and to encourage them to pursue careers in STEM.

• Instrumentation purchases. The program allows universities to purchase basic laboratory equipment for research and education program enhancements to highly sophisticated research instruments, such as lasers and spectrometers.

• Technical assistance. The funds are used to design programs that enhance the ability of minority institutions to successfully compete for future Defense funding. The objective is to assist the HBCU/MI community in areas such as proposal writing and administration of grants and contracts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	33.263	35.834	23.572
Description: The HBCU/MI program provides support for research and collaboration with DoD facilities and personnel. The research grants further knowledge in the basic physical scientific and engineering disciplines through theoretical and empirical activities. Collaborative research allows university professors to work directly with DoD laboratories or other universities.			
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601228D8Z / *Historically Black Colleges and Universities and Minority Institutions*	**Project (Number/Name)** P448 / *Historically Black Colleges and Universities and Minority Institutions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Conducted annual competition of the HBCU/MI program for basic research and student support. The competition resulted in 43 basic research grant awards totaling $24.000 million supporting 66 undergraduate students and 77 graduate students/post docs, for a total of 143. The students will receive tuition and stipends for participating in the research. Continued the research and educational collaboration for the STEM Prep project with HBCUs: Paul Quinn College and Cheyney University of Pennsylvania. Increased the number of FY 2015 summer interns from 79 to 85 participants in the DoD Labs. Established new Centers of Excellence in support of the ASD(R&E) Science and Technology priorities in the areas of Cyber Security, Research Data Analysis, and Autonomy. Conducted two outreach webinars to expose HBCUs/MIs to opportunities in DoD totaling $0.200 million. ***FY 2016 Plans:*** Continue efforts from FY 2015. Conduct annual competition of the HBCU/MI program for basic research, student support, and/or equipment/instrumentation. Continue the research and educational collaboration for the STEM Prep project with HBCUs: Paul Quinn College and Cheyney University of Pennsylvania. The goal is to increase the number of FY 2016 summer interns from 85 to 100 participants. Continue the efforts from FY 2015 to establish new Centers of Excellence in support of the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) Science and Technology priorities in the areas of Cyber Security, Research Data Analysis, and Autonomy. Conduct annual review of the Centers. ***FY 2017 Plans:*** Continue efforts from FY 2016. Conduct annual competition of the HBCU/MI program for basic research, student support, and/or equipment/instrumentation. The number of grant awards will be reduced by three to account for the program change for higher priority DoD requirements. Continue the research and educational collaboration for the STEM Prep project with HBCUs: Paul Quinn College, Cheyney University of Pennsylvania, and add North Carolina Central University. The goal is to maintain the number of FY 2017 summer interns at 100 participants. Monitor established Centers of Excellence in support of the ASD(R&E) Science and Technology priorities in the areas of Cyber Security, Research Data Analysis, and Autonomy. Conduct annual review of the Centers.			
Accomplishments/Planned Programs Subtotals	33.263	35.834	23.572

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 1	**R-1 Program Element (Number/Name)** PE 0601228D8Z / *Historically Black Colleges and Universities and Minority Institutions*	**Project (Number/Name)** P448 / *Historically Black Colleges and Universities and Minority Institutions*

E. Performance Metrics

- Number of students funded other than undergraduates.
- Number of undergraduate students funded.
- Number of undergraduates funded who graduated.
- Number of students participating in the Centers of Excellence for Research and Education.
- Number of students working in Defense Laboratories.
- Number of undergraduates funded who graduated with degrees in STEM.
- Number of graduates who will continue to pursue graduate or Ph.D. degrees in STEM.
- Number of graduates who intend to work for DoD.
- Number of undergraduates who will receive scholarships and fellowships for further studies in STEM.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	56.692	19.491	19.314	17.745	-	17.745	19.128	19.348	19.615	20.000	Continuing	Continuing
P000: *Insensitive Munitions*	39.657	13.310	13.044	11.993	-	11.993	12.927	13.076	13.256	13.516	Continuing	Continuing
P204: *Enabling Fuze Technology*	17.035	6.181	6.270	5.752	-	5.752	6.201	6.272	6.359	6.484	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program addresses applied research associated with improving the lethality, reliability, safety, and survivability of munitions and weapon systems. The goal is to develop and demonstrate joint enabling technologies that can be used by the Program Executive Officers (PEOs) as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus maximizing efficiencies, ensuring the development of technology with the broadest applicability while avoiding duplication of efforts.

Munition Area Technology Groups (MATGs) and Fuze Area Technology Groups (FATGs) have been established for each munition and capability area and are tasked with: 1) coordinating, establishing, and maintaining 2018 and 2023 year technology development plans and roadmaps, 2) coordinating biannual meetings to review technical and programmatic details of each funded and proposed effort, 3) developing and submitting Technology Transition Agreements in coordination with appropriate PEOs for insertion in their Insensitive Munitions (IM) Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The Joint Insensitive Munitions Technology Program (JIMTP) and Joint Fuze Technology Program (JFTP) will utilize a Technical Advisory Committee (TAC) (consisting of senior Department of Defense (DoD) and Department of Energy (DOE) laboratory representatives, and senior Munitions PEO representatives) to provide program oversight, policy, direction, and priorities during its annual meeting.

The Insensitive Munitions (IM) effort will demonstrate enabling technologies needed to develop weapons in compliance with requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoD Instruction 5000.1. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority munitions identified in the PEO IM Strategic Plans. Mature demonstrated IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other non-compliant munitions within their portfolios.

The JIMTP investments focus on five Munition Areas: 1) High Performance Rocket Propulsion (HPP), 2) Minimum Signature Rocket Propulsion (MSP), 3) Blast and Fragmentation Warheads (BFW), 4) Anti-Armor Warheads (AAW), and 5) Gun Propulsion (GP). MATGs, under tri-service leadership, have developed technology roadmaps for each Munition Area that are used to guide investments based on goals consistent with the DoD IM Strategic Plan. These IM technologies, alone or in combination, will be developed and tested at the small-scale, and for eventual incorporation in hardware, simulating real-world munitions, to demonstrate their utility and feasibility.

The Enabling Fuze Technology effort will also demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development of the Force (GDF), the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will develop fuzing technologies and mature them for transition into advanced technology (Budget Activity (BA)

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*

6.3) programs and/or design tools and protocols for weapon fuzing. In this way, the Service and Industrial base weapon and fuze communities will be able to heavily leverage and apply these emerging and promising technologies in fuzing modeling and simulation tools, multi-point initiation, high reliability fuze architectures, survivable components, modular fuze packaging, and fuze sensor.

The Joint Fuze Technology Program investments focus on four specific capability areas that have been identified by Department's strategic guidance and current shortfalls in weapon systems and will be validated by the PEOs and the Heads of the Service Science and Technology (S&T) communities. The capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	20.037	19.352	19.388	-	19.388
Current President's Budget	19.491	19.314	17.745	-	17.745
Total Adjustments	-0.546	-0.038	-1.643	-	-1.643
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.351	-			
• Realignment for Higher Priority Programs	-	-	-1.506	-	-1.506
• FY15 Reprog. for Cancelled Account	-0.007	-	-	-	-
• Other Reprogrammings	-0.188	-	-	-	-
• FFRDC Reduction	-	-0.038	-	-	-
• Economic Assumptions	-	-	-0.137	-	-0.137

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / *Joint Munitions Technology*	Project (Number/Name) P000 / *Insensitive Munitions*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P000: *Insensitive Munitions*	39.657	13.310	13.044	11.993	-	11.993	12.927	13.076	13.256	13.516	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Insensitive Munitions (IM) Technology Program (JIMTP) aims to develop the enabling technologies needed to build weapons in compliance with statutory requirements (United States Code, Title 10, Chapter 141, Section 2389) and regulation (DoDI 5000.1 and 5000.02, and CJCSI 3170.01F). This effort will take promising technologies developed at the laboratory scale and mature them for transition into advanced technology (Budget Activity (BA) 6.3) programs based on the priority munitions identified in the DoD IM Strategic Plans. Mature and demonstrated IM technology can be transitioned to the PEOs, thereby decreasing the program costs and schedule risk. This will additionally promote spin-offs to other non-compliant munitions within the DoD portfolio. Without new technology, future variants of current weapon systems will have the same, or worse, response to IM stimuli. New weapon developments will face similar challenges. This is especially true with increased performance requirements for improved and new systems.

The JIMTP investments focus on five Munition Areas: 1) High Performance Rocket Propulsion, 2) Minimum Signature Rocket Propulsion, 3) Blast and Fragmentation Warheads, 4) Anti-Armor Warheads, and 5) Gun Propulsion. Munition Area Technology Groups (MATGs), under tri-service leadership, have developed technology roadmaps for each Munition Area that are used to guide investments based on goals consistent with the DoD IM Strategic Plans. The program is structured around these five areas with clear cross-cutting tasks.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: High Performance Rocket Propulsion (HPP)	3.628	3.549	3.349
Description: HPP focuses on the development of technologies to improve the IM response of HPP systems, rocket motors with Ammonium Perchlorate and with or without a metal fuel, for rockets and missiles launched from air, ground, and sea platforms. These technologies, when applied to rocket motors, improve to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, rocket propellant ingredients, including synthesis, characterization and scale-up; reduced smoke or smoky propellants, including formulation, characterization and scale-up; rocket motor case design; materials for active and passive thermal mitigation; shock mitigation materials and techniques; passive and active coatings; active and passive venting techniques for motor cases or containers; ignition systems; sensors; and thrust mitigation techniques. Operating conditions may be controlled or widely varying in both temperature and vibration. The 2018 and 2023 year goals of the HPP MATG are concentrated on solving the IM response of missile propulsion systems due to Fragment Impacts and Slow Cook Off for the majority of HPP rocket motors, and solving the Fast Cook Off response of very large HPP motors.			
FY 2015 Accomplishments: - Synthesized and characterized less reactive ingredients for high performance rocket motor propellant that will maintain missile performance.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P000 / *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conducted bench-top testing of motor case venting devices. - Conducted sub-scale testing and analysis to validate a new sub-scale test to predict full-scale reactions in cook-off and impact testing. - Conducted small scale testing on energetic materials to assess pre-ignition processes and novel mitigation device. ***FY 2016 Plans:*** - Formulate and conduct characterization, aging, and small scale performance testing on rocket propellant formulation composed of less reactive ingredients. - Optimize novel mitigation device design and conduct small scale tests. - Produce 25 gram batches and complete characterization data on new slow cook-off propellant formulation. - Conduct critical temperature and auto ignition tests on formulations and down select best performing modifications for year 2 formulation effort using a new sub-scale test to predict full-scale reactions in cook-off and impact testing. - Conduct preliminary testing on remote sensing device and interface sensing unit with venting device. - Establish baseline thermal history model to optimize current code to create a baseline model to correctly simulate the heat transfer and propellant decomposition chemistry. ***FY 2017 Plans:*** - Demonstrate acceptable small scale SCO properties and demonstrate acceptable safety, tensile, and ballistic properties at the pint scale for new slow cook-off propellant formulation. - Demonstrate the concept and feasibility of a plateau burning propellant that will not maintain a reaction at elevated pressure - Integrate di-electric sensors into subscale motor test article. - Collect thermally damaged propellant burning rates to measure burning rate as a function of thermal exposure.			
Title: Minimum Signature Rocket Propulsion (MSP)	2.530	2.464	2.254
Description: MSP focuses on the development and demonstration of technologies to improve the IM response of MSP systems. The development and demonstration of minimum signature (MS) rocket technologies, when applied to munition systems, will improve munition IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, MS rocket propellant formulations, ingredients for MS propellant formulations (including synthesis, characterization and scale-up), case and packaging design, active and passive venting techniques, rocket motor case design, ignition systems, and thrust mitigation techniques. Of particular interest are technologies that provide a higher burning rate minimum signature propellant with state-of-the-art energy and reduced shock sensitivity. The 2018 and 2023 year goals of the MSP MATG are concentrated on solving the IM response of missile propulsion systems due to Fragment Impact, Slow Cook Off, and Shaped Charge Jet (SCJ) threats. ***FY 2015 Accomplishments:***			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P000 / *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conducted mechanical, safety, and card gap testing, and determined ballistic properties of novel coated material minimum signature propellant. - Conducted design of experiments of candidate coated formulations and down-selected to most promising candidate to provide desired performance characteristics. - Conducted final characterization tests and slow cook-off tests to validate new coated formulation in preparation for transition to BA3 for a demonstration. - Built and tested unique venting mechanisms in various configurations in environmental and cook-off tests. - Characterized baseline and novel MS propellant using ABVR screening test. - Developed an analysis tool and conducted composite material testing that will provide mitigation of shock response for fragment impact while providing the necessary material strength for solid rocket motors and launch tubes. ***FY 2016 Plans:*** - Conduct impact testing on baseline and novel MS propellants in representative cylindrical container to investigate propellant reactions relative to ABVR test result predictions. - Fabricate and test composite materials to validate modeling and analysis. Optimize materials and optimize design for future testing. - Synthesize and scale up newly selected propellant ingredient to one kilogram batch for initial characterization studies. - Analyze and fabricate composite material launch tube and perform fragment impact testing to gain data on material and fragment response. Optimize design based upon results. - Conduct cylindrical configuration propellant response testing to validate testing conducted on flat samples. - Scale up to one pint mix new minimum signature propellant formulations and conduct safety testing. - Produce 250 gram batches of novel material for propellant formulation. ***FY 2017 Plans:*** - Fabricate baseline and optimized configurations with inert energetic and embedded sensors and conduct fragment impact testing of baseline and optimized configurations. - Validation of modeling will be conducted using a full scale propellant subjected to fragment impact testing. Comparison of data to predicted results will determine success of model. - Formulate extruded double base (NC/NG) types of energy levels without the use of nitro glycerin (NG) making the propellant much safer and resistant to shock - Develop predictive test tools for evaluation of novel propellant materials based on web thickness and bore size.			
Title: Blast and Fragmentation Warheads (BFW)	2.676	2.625	2.415
Description: BFW focuses on the development of technologies to improve the IM response of Blast/Fragmentation munitions. These technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
to other IM threats and, at minimum, maintain munition performance. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability and reliability may be critically important depending on the intended munition application. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection or packaging materials and systems, shock mitigation liners, initiation devices, techniques, and technologies. Applications vary but include high performance warhead fills, booster explosives, bulk demolition charges, and bulk fills for blast and/or fragmentation charges. The 2018 and 2023 year goals of the BFW MATG are concentrated on solving the IM response of blast fragment warheads to the Sympathetic Detonation, Fast Cook Off, and SCJ threats.			
FY 2015 Accomplishments: - Scaled up synthesis process of novel energetic material to produce one kilogram batches to provide multiple grain size material. Examined fundamental properties and conducted characterization testing on manufactured materials. - Performed safety, IM, and performance testing on novel energetic formulations. Analyzed results to define failure diameter and establish baseline data for designing IM formulations for transition to a possible BA 6.3 demonstrator. - Scaled up to 40 gram batches unique energetic material and conducted performance and thermal response testing. - Proved concept for detonation train for IM fills for large warheads. Analyzed data for formulation to assess the insensitivity to an IM threat. - Predicted the potential for passing sympathetic reaction testing based on explosive data gathered during preliminary small-scale testing.			
FY 2016 Plans: - Conduct large scale gap experiment, as well as bullet and fragment impact testing on unique explosive formulation for large warheads. - Continue to mature explosive initiation device design and conduct small-scale performance testing. Down-select design and begin design refinement. - Utilize novel coating process and scale up formulations of high energy explosive. Prepare samples and conduct screening tests. - Refine fuze booster design, conduct M&S to develop companion auxiliary booster to complete the explosive train, and include implications to future cost and manufacturing process. - Investigate unique initiation method environmental operating range while meeting IM criteria. - Conduct small scale experiments to investigate impact on performance and sensitivity of novel lining material for air to air warhead - Conduct baseline testing with known explosive materials to validate new model.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Conduct verification tests on fuze booster design in preparation for transition to BA3 demonstration. - Develop replacement explosives for higher power Artillery and mortar systems such as the M1130 and MAPAM - develop and scale up novel meltable materials to improve munitions responses to slow cook off. - Conduct fragment impact tests on materials after unique initiation method exposure. - demonstrate the possibility of fully insensitive materials (off) that can be “activated” (on) before being used to improve the safety and logistics burden. - Validate the predicted results with experimental results from two explosive materials, at two different sizes. Compare to existing data.			
Title: Anti-Armor Warheads (AAW)	2.438	2.395	2.185
Description: AAW focuses on the development of explosive ingredients, explosives, and warhead and fuze technologies for improving IM of AAW munitions. The development of explosive ingredients, explosives, and warhead and fuze technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintain munition performance. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection/packaging materials and systems, shock mitigation liners, and initiation devices, techniques, and technologies. Applications vary but include high performance warhead fills, booster explosives, and all other technology to mitigate the violent response of AAW munitions to IM threats. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, and reliability may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the AAW MATG are concentrated on solving the IM response of anti-armor warheads to the Fragment Impact, Sympathetic Reaction, and Shaped Charge Jet threats for larger munitions and the Fragment Impact, Slow Cook-off, and Sympathetic Reaction / Shaped Charge Jet threats for Medium Caliber Munitions. ***FY 2015 Accomplishments:*** - Scaled up synthesis of newly identified explosive ingredient with high performance and low sensitivity potential. - Developed and characterized explosive formulations using a recently scaled-up newly identified explosive ingredient. - Conducted slow cook-off and small scale sympathetic detonation test on unique combined effects explosive formulation. - Down-selected formulations of energetic materials composed of finer particle size nitramine content and enhanced insensitivity and conducted small scale cookoff and fragment impact testing. Prepared five pound batches of selected formulation. - Conducted small scale slow cook-off, fragment impact and shaped charge testing on unique high energy melt cast explosive formulation for transition to BA 6.3 project.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Designed surrogate munition and shaped charge jet impact initiation testing configurations to demonstrate models utility for weapon design. ***FY 2016 Plans:*** - Conduct tests using surrogate munition and shaped charge jet impact initiation testing configurations to validate models utility for weapon design. - Complete design of experiments, manufacture of down-selected formulations, and do characterization study of newly identified explosive ingredient with high performance and low sensitivity potential. - Investigate and predict initiation response of explosive due to SCJ stimuli using the model. - Mature formulation and process ability using new production technique. - Produce 100 pounds of a unique material and conduct formulation studies using a design of experiments to optimize the IM response. - Conduct small-scale mixtures to assist design of experiments for formulation of plastic explosive. ***FY 2017 Plans:*** - Complete in-situ mixing and casting of warheads in preparation for component testing using RAM technology. - Prepare and demonstrate an IM shock improvement by creation of nano explosive composites. - Demonstrate a ground to air weapon with improved shock sensitivity to the current Javelin system.			
Title: Gun Propulsion (GP) ***Description:*** GP focuses on the development and demonstration of technologies in the area of GP systems. The development and demonstration of gun propulsion technologies, when applied to munition systems, will improve munition IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, gun propellant formulations, ingredients for gun propellant formulations, including synthesis, characterization and scale-up, cartridge case and packaging design, active and passive venting techniques, reduced sensitivity primer propellant and primer systems, and robust primers for insensitive propellants. Applications vary, but include both large and medium caliber munitions, as well as propelling charges for mortars and shoulder launched munitions. Operating requirements vary, and other factors such as barrel life and operation over varying environmental conditions may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the GP MATG are concentrated on solving the IM response of gun propulsion munitions to Fragment Impact and Slow Cook Off threats. ***FY 2015 Accomplishments:*** - Conducted slow cook-off tests in new apparatus to validate test small scale test protocol for propellant formulations. - Established data set of required material characteristics after exposure to novel ignition methodology. - Down selected unique process ingredients and completed sub-scale IM testing of propellant.	2.038	2.011	1.790

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P000 / *Insensitive Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Optimized propellant candidates for new projectile and evaluated performance and sensitivity. Scaled-up and characterized new primer to conduct modeling and to optimize the configuration to enable full scale testing. ***FY 2016 Plans:*** - Mature unique process ingredient propellant formulation, conduct gun testing and prepare for large scale manufacturing of propellant to prepare for slow cook-off testing. - Conduct impact performance testing of propellant and primer for new projectile. - Compile ballistic performance data on coated propellant for modelers. - Scale up two candidate materials for manufacturing and characterization studies for new propellant. - Prepare propellant formulations using three different methods, to compare product sensitivity and processing characteristics. - Develop two new large caliber propellant production techniques and use modeling and simulation to down select the formulations that will produce the least sensitive materials. ***FY 2017 Plans:*** - Integrate primer and conduct full scale gun testing on new propellant for fragment impact and slow cook-off response. - Prepare advanced coating materials and mixing methods to improve sensitivity to shock. - Conduct characterization studies on new large caliber propellant formulations, down select and conduct sub-scale IM testing. - Demonstrate a new gun propellant and cook off system for the 120mm rifled mortar system that can also improve the response of the HEGM system.			
Accomplishments/Planned Programs Subtotals	13.310	13.044	11.993

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603000D8Z P002: *BA 3 Insensitive Munitions Advanced Technology*	17.826	19.229	17.756	-	17.756	19.200	19.398	19.598	19.984	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transition of technologies developed by the Program are tracked and documented by technology maturity.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P000 / *Insensitive Munitions*

2) Munition Area Technology Group (MATG) Technology Roadmaps are prepared, evaluated, and analyzed by Joint Insensitive Munitions Technology Program management and technical staff.
3) Chairman's Annual Assessments for each MATG are critically reviewed by the Technical Advisory Committee to determine progress, transition plans, and relevance of each project.
4) Project progress toward goals and milestones is assessed at each MATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) External Peer Review of Projects conducted as part of Joint Army/Navy/NASA/Air Force meetings.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / *Joint Munitions Technology*	Project (Number/Name) P204 / *Enabling Fuze Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P204: *Enabling Fuze Technology*	17.035	6.181	6.270	5.752	-	5.752	6.201	6.272	6.359	6.484	Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort will demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development of the Force (GDF), the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will develop enabling technologies at the laboratory scale and transition them into Budget Activity (BA) 6.3 demonstration programs for weapons where priority capabilities and technology needs have been identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service Science and Technology (S&T) communities. Mature BA 6.2 fuze technologies will be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other munitions within their portfolios.

Under the Joint Fuze Technology Program (JFTP), investments are focused on specific capability areas that have been identified by the Department's strategic guidance and current shortfalls in weapon systems and validated by the PEOs and Heads of the Service S&T communities. The four capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects (TE) Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Hard Target Fuzing	1.586	1.617	1.504
Description: The Hard Target Fuzing challenges are grouped into three Technology Areas. First, improved modeling and simulation capabilities provide the validated computational tools necessary for hard target applications. Second, basic phenomenology & understanding of the Fuze Environment is the science-based endeavor of providing the test equipment, instrumentation, and analysis techniques for experimentation and data gathering necessary for next generation fuzing. Third, hard target survivable fuze components are developed to increase the effectiveness of facility denial munitions by improving the prediction tools and testing methodologies to evaluate the survivability and functionality of legacy and future fuzes. Development of these technologies will enable next generation boosted and hypersonic penetrators to execute missions against hardened and deeply buried targets.			
FY 2015 Accomplishments: - Developed and tested alternative packaging technology for the electronic components of a fireset to improve fuze survivability and reliability for legacy free-fall penetrating weapon applications.			
FY 2016 Plans: - Continue development of advanced fuze packaging and alternate low-cost media detection sensor for to measure post impact weapon environments.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P204 / *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Develop modeling & simulation tools to enable prediction within 10 percent of experimental results for peak acceleration and duration at the fuze level in free fall penetrating weapons. ***FY 2017 Plans:*** - Develop and demonstrate 3-D printed fuze electronic components and packaging technologies for survivability and reliability in DoD hypersonic penetrating weapons. - Develop fuze energetic and firing components to reliably and function in boosted and hypersonic penetrators munitions.			
Title: Tailorable Effects Fuzing ***Description:*** Develop fuzing for tailorable effects weapons that encompasses the ability to selectively vary the output of the weapon (Dial-a-Yield) and/or the ability to generate selectable effects (directed blast, fragmentation). Develop initiation and multi-point technologies; electronic safe and arm based multi-point initiators for tunable output – scalable yield warheads; MicroElectro-Mechanical Systems (MEMS) based multi-point initiators for tunable output/scalable yield warheads; and smart fuzing for tailorable effects weapons. These technologies will enable weapons that can effectively defeat a variety of targets while minimizing unintentional collateral effects. ***FY 2015 Accomplishments:*** - Developed and demonstrated primary explosive ink micro-detonators with high output and low sensitivity for use in MEMS fuzes in Med—Caliber rounds and future miniature weapons. ***FY 2016 Plans:*** - Development of multi-point inline firing system in simultaneous and/or post-impact delay into Double Reinforced Concrete (DRC) / Brick over Block (BOB) or equivalent target IAW Redstone Test Center (RTC) standards. ***FY 2017 Plans:*** - Develop wirelessly powering and functioning distributed detonating output nodes in a multi-output safe, arm, and fire system for distributed weapon fuzing and initiation systems, eliminating the need for complex cable assemblies and adding flexibility for easily customizing. - Demonstrate and transition into 6.3 advanced technology development of Hardened Selectable Multipoint Fireset technologies that provides reliable, selectable detonation of tailorable effects warheads.	1.568	1.512	1.303
Title: High Reliability Fuzing ***Description:*** Develop high reliability fuzing architectures, fuzing components, and Unexploded Ordnance (UXO) reduction features. These technologies will enable the next generation of cluster munitions to achieve the required greater than 99 percent reliability goal. Evolving DoD emphasis on increased weapon system reliability is driving the need to consider new and novel approaches for achieving increased fuze reliability while maintaining or enhancing fuze design safety. DoD policy, higher weapon	1.528	1.595	1.475

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P204 / *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies. ***FY 2015 Accomplishments:*** - Developed and demonstrated MEMS structures that give existing MEMS Fuzes the ability to self-report safety and reliability compromises in an effort to improve reliability. ***FY 2016 Plans:*** - Complete testing and characterization of MEMS safety and arming (S&A) micro scale materials and energetics to transition into high reliability low cost munitions technology applications. - Develop experimental techniques and apply M&S tools to analyze and evaluate fuze components and explosive trains to increase margin of reliability in fuze design. ***FY 2017 Plans:*** - Develop and demonstrate energy harvesting and free fall sensor technologies to power an electronic safe-arm fuze resulting in an increased margin of reliability in general purpose bomb fuzes. - Investigate reactive growth process at ideal and marginal conditions to guide the quantification of fuze explosive train margin and performance. Applications include: Air Force penetrator weapon demo programs and Army M935 and PGK fuzes.			
Title: Enabling Fuze Technologies ***Description:*** Develop common/modular fuze architecture; innovative fuze component technologies; sensors; next generation fuze setting capability, tools and modeling; and fuzing power sources. These fuzing technologies will provide smaller, more cost effective solutions while meeting or exceeding the performance of existing technologies. Development of these technologies will enable future weapon applications to be more mission adaptive and smaller along with improved target detection capabilities. ***FY 2015 Accomplishments:*** - Researched and identified failure modes in flash programmable logic devices (F-PLD) that enables reliable, safe, and effective use of F-PLDs as fuze components. ***FY 2016 Plans:*** - Develop and demonstrate low cost, small energy harvesting and event detection sensors for application in cannon fire projectile fuzing that improves safety. - Continue development of prototype wireless technology system so as to provide power and data transfer to aerial rockets and small guided munitions for use on US Army rotary aircraft. ***FY 2017 Plans:***	1.499	1.546	1.470

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602000D8Z / *Joint Munitions Technology*	**Project (Number/Name)** P204 / *Enabling Fuze Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Develop fast radar signature simulation tool for application in fuzing sensor algorithms that will enables rapid detection and processing of complex targets during weapon end-game. - Develop a reliable, low cost (reduce by 40%) pulse discharge switch for application in electronic safe/arm fuzes (ESAFs).			
Accomplishments/Planned Programs Subtotals	6.181	6.270	5.752

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603000D8Z P301: *BA 3 Enabling Fuze Advanced Technology*	6.306	6.686	6.146	-	6.146	6.658	6.706	6.797	6.930	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transition of technologies developed by the Program are tracked and documented by technology maturity.
2) Fuze Area Technology Group (FATG) Technology Roadmaps are prepared, evaluated, and analyzed by Joint Fuze Technology Program management and technical staff.
3) Chairman's Annual Assessments for each FATG are critically reviewed by the Technology Advisory Committee to determine progress, transition plans, and relevance of each project.
4) Project progress toward goals and milestones is assessed at each FATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) Technology Transition Agreements in place with Munitions programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602230D8Z / *Defense Technology Innovation*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	30.000	-	30.000	30.000	30.000	30.000	30.000	Continuing	Continuing
P835: *Defense Technology Innovation*	-	0.000	0.000	30.000	-	30.000	30.000	30.000	30.000	30.000	Continuing	Continuing

Note

This PE is a new start in FY 2017.

A. Mission Description and Budget Item Justification

This program will fund the development of novel leading-edge technologies emerging from high-tech companies that are not traditional defense contractors. These funds will enable the Department to source break through and emerging technologies applicable to the defense mission as identified in the Defense Innovation Unit Experimental (DIUx), or the Components, for potential incorporation into the Department's weapon systems and operational capabilities.

An objective of this program is to obtain innovative ideas from industry that have low technology readiness of high priority to DoD leadership. Incoming proposals will be approved by the Assistant Secretary of Defense, Research and Engineering to ensure alignment with the DoD's strategic objectives and increase our permeability to disruptive change, and strengthen our nation's security.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	30.000	-	30.000
Total Adjustments	0.000	0.000	30.000	-	30.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	30.000	-	30.000

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602230D8Z / *Defense Technology Innovation*	Project (Number/Name) P835 / *Defense Technology Innovation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P835: *Defense Technology Innovation*	-	0.000	0.000	30.000	-	30.000	30.000	30.000	30.000	30.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program will fund the development of novel leading-edge technologies emerging from high-tech companies that are not traditional defense contractors. These funds will enable the Department to source break through and emerging technologies applicable to the defense mission as identified in the Defense Innovation Unit Experimental (DIUx), or the Components, for potential incorporation into the Department's weapon systems and operational capabilities.

An objective of this program is to obtain innovative ideas from industry that have low technology readiness of high priority to DoD leadership. Incoming proposals will be approved by the Assistant Secretary of Defense, Research and Engineering to ensure alignment with the DoD's strategic objectives and increase our permeability to disruptive change, and strengthen our nation's security.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Technology Innovation	-	-	30.000
FY 2017 Plans: This program will fund the development of novel leading-edge technologies emerging from high-tech companies that are not traditional defense contractors. These funds will enable the Department to source break through and emerging technologies applicable to the defense mission as identified in the Defense Innovation Unit Experimental (DIUx), or the Components, for potential incorporation into the Department's weapon systems and operational capabilities.			
Accomplishments/Planned Programs Subtotals	-	-	30.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	49.409	50.925	48.269	-	48.269	49.793	56.091	56.911	57.930	Continuing	Continuing
P534: *Lincoln Laboratory*	-	40.135	41.994	39.576	-	39.576	44.340	49.382	50.104	51.006	Continuing	Continuing
P535: *Technical Intelligence*	-	9.274	8.931	8.693	-	8.693	5.453	6.709	6.807	6.924	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Lincoln Laboratory (LL) research line program is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). The LL Program funds innovations that directly lead to the development of new system concepts, technologies, components and materials in support of Lincoln Laboratory's missions in Advanced Technology; Communications Systems; Cyber Security and Information Sciences; Intelligence, Surveillance and Reconnaissance Systems and Technology; Tactical Systems; Space Systems and Technology; Air, Missile and Maritime Defense; Engineering; and Homeland Protection. The Lincoln Laboratory Program supports these missions by conducting research and development in nine science and engineering disciplines: - Advanced Devices, with emphasis on development of devices and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new approaches to Department of Defense (DoD) systems. - Optical Systems and Technologies, including the development of focal plane arrays, integrated imagers, laser communications, imaging and spectroscopic detection systems. - Radio Frequency (RF) Systems and Technologies, including the development of novel active and passive radio frequency (RF) sensors, development of electronic protection and electronic attack technologies, and system concepts and communication systems. - Information, Computation, and Exploitation, which includes the development of novel architectures, tools, and techniques for the processing, fusion, interpretation, computation, and exploitation of multi-sensor, multi-intelligence data. - Cyber Security, which includes the development of technologies and new techniques for the protection of systems against cyber attack and exploitation. - Biomedical Sciences and Technology, which supports the development of technologies to aid the warfighter, to investigate relevant research in brain and cognitive sciences, to develop engineered biological systems, and to assess physical performance and injury recovery. - Autonomous Systems, which includes the development of technologies with the objective of developing mobile, autonomous, robotic platforms, as well as sensors and algorithms that support key capabilities needed for a wide range of defense applications. - Quantum System Sciences, which develops basic technologies that support sensing, communication and computation using quantum information, focusing on the demonstration of scalable computation platforms, demonstration of quantum protected communications and magnetic field sensing using highly-compact, atomic-like defects in diamond. - Novel and Engineered Materials, with emphasis on new materials for additive manufacturing and emerging nanoscale materials.

Supporting these and other priority technology and capability areas are work efforts entitled Technical Intelligence:
- The Technical Intelligence Program provides global science and technology (S&T) awareness and context in order to assist Defense decision-makers plan for an uncertain future. The program uses intelligence-based and open-source information to characterize today's global S&T environment, exploiting novel technology watch and horizon scanning (TW/HS) tools to identify nascent and disruptive technologies that will shape tomorrow's future. The program complements this with tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations for emerging and disruptive technologies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	47.807	51.026	51.369	-	51.369
Current President's Budget	49.409	50.925	48.269	-	48.269
Total Adjustments	1.602	-0.101	-3.100	-	-3.100
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.580	-			
• Realignment for Higher Priority Programs	0.000	-	-2.727	-	-2.727
• FY15 Reprog. for Cancelled Account	-0.018	-	-	-	-
• Other Reprogrammings	3.200	-	-	-	-
• FFRDC Reduction	-	-0.101	-	-	-
• Economic Assumptions	-	-	-0.373	-	-0.373

Change Summary Explanation

The FY 2015 and FY 2017 adjustment and internal realignments involve funding for higher Department priorities that support the Advanced Capabilities Deterrence Panel / Third Offset strategy.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / *Lincoln Laboratory*	Project (Number/Name) P534 / *Lincoln Laboratory*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P534: *Lincoln Laboratory*	-	40.135	41.994	39.576	-	39.576	44.340	49.382	50.104	51.006	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Lincoln Laboratory (LL) research line program is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). The LL Program funds innovations that directly lead to the development of new system concepts, technologies, components and materials in support of Lincoln Laboratory's missions in Advanced Technology; Communications Systems; Cyber Security and Information Sciences; Intelligence, Surveillance and Reconnaissance Systems and Technology; Tactical Systems; Space Systems and Technology; Air, Missile and Maritime Defense; Engineering; and Homeland Protection. The Lincoln Laboratory Program supports these missions by conducting research and development in nine science and engineering disciplines: - Advanced Devices, with emphasis on development of devices and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new approaches to Department of Defense (DoD) systems. - Optical Systems and Technologies, including the development of focal plane arrays, integrated imagers, laser communications, imaging and spectroscopic detection systems. - Radio Frequency (RF) Systems and Technologies, including the development of novel active and passive radio frequency (RF) sensors, development of electronic protection and electronic attack technologies, and system concepts and communication systems. - Information, Computation, and Exploitation, which includes the development of novel architectures, tools, and techniques for the processing, fusion, interpretation, computation, and exploitation of multi-sensor, multi-intelligence data. - Cyber Security, which includes the development of technologies and new techniques for the protection of systems against cyber attack and exploitation. - Biomedical Sciences and Technology, which supports the development of technologies to aid the warfighter, to investigate relevant research in brain and cognitive sciences, to develop engineered biological systems, and to assess physical performance and injury recovery. - Autonomous Systems, which includes the development of technologies with the objective of developing mobile, autonomous, robotic platforms, as well as sensors and algorithms that support key capabilities needed for a wide range of defense applications. - Quantum System Sciences, which develops basic technologies that support sensing, communication and computation using quantum information, focusing on the demonstration of scalable computation platforms, demonstration of quantum protected communications and magnetic field sensing using highly-compact, atomic-like defects in diamond. - Novel and Engineered Materials, with emphasis on new materials for additive manufacturing and emerging nanoscale materials

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Devices	6.100	5.884	5.578
Description: This project develops materials, devices, and subsystems utilizing microelectronic, nanostructure, photonic, biological, and chemical technologies that enable new system approaches to Department of Defense (DoD) systems. ***FY 2015 Accomplishments:*** The continuing Quantum Cascade Laser program produced devices that resulted in an infrared power output of greater than 500 mW at a wavelength near 9 micron, making it effective for infrared countermeasures. New digital charge-coupled devices (CCDs) imagers with on-chip digitization and processing at each pixel enabled near-zero-noise images. The project built and tested six 512x512 CCD imagers addressing the growing demand for improved large-format imagers for intelligence, surveillance, and reconnaissance. LL continued developing integrated optics for a novel optical- communications architecture as well as for chemical sensing in the mid-infrared spectral region. For optical communications, the Lab prototyped an 8-channel functional			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P534 / *Lincoln Laboratory*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
wavelength-division multiplexed (WDM) laser communications transceivers that will provide a new class of flexible, efficient communication devices. Development began on germanium charge-coupled devices (CCDs) that can offer broadband visible and short-wave infrared imaging, as well as sensitivity for higher-energy x-rays relative to silicon-based detectors. Microhydraulic actuators demonstrated a strength approaching that of human muscle. Lincoln Laboratory also designed, fabricated, and tested a soft microrobotic arm. ***FY 2016 Plans:*** Development of advanced CCD technology will remain a focus in FY 2016. The next steps will be taken in ongoing work on germanium-based CCDs as well as digital CCD technology. Work on integrated optics for flexible laser communication transceivers will continue. A new effort will be added to explore the potential for integrated optics to decrease the size and weight of positioning, navigation, and timing (PNT) solutions such as navigation-grade gyroscopes. Work will continue on efforts to develop transistors in diamond for high power, high frequency radar, electronic warfare and communication applications; and new micro-fluidic actuators based on super-capacitor technology for robotics and biomedical applications. ***FY 2017 Plans:*** Prototype Germanium-based CCDs and all-digital-pixel CCDs will be fabricated and developed for specific applications. Anticipated progress toward high-power diamond transistors should see the incorporation of such transistors in prototype circuits. Work will continue on integrated photonic designs for low SWaP applications.			
Title: Optical Systems and Technologies	6.100	6.706	6.356
Description: This project develops focal planes, integrated imagers, laser communication systems, imaging and spectroscopic systems applicable to DoD missions. ***FY 2015 Accomplishments:*** Activities related to multi-aperture interferometry showed significant progress. Development of interferometric imaging algorithms for a deployable space telescope on a CubeSat led to sponsored funding for specific parts of the deployable technology portfolio. A novel concept for coded-aperture imaging may enhance resolution by an order of magnitude over comparably sized unmasked imagers. A separate effort demonstrated all-electronic adaptive optical coherent communications with distributed apertures. Surrogates for chemical and biological agents have been remotely detected with a new technique called photothermal speckle interferometry. Studies of undersea optical communication suggest that high data rates can be achieved over much larger distances than previously demonstrated. Last, but not least, 3D ladar systems were miniaturized to allow their integration on much smaller platforms. ***FY 2016 Plans:*** A demonstration of deployable telescope technology will provide proof-of-concept for high-resolution imaging from a CubeSat in low-earth orbit. Imaging algorithms will be developed for laboratory demonstrations of interferometric and coded-aperture imaging. The undersea communication hardware will be assembled and demonstrated in a variety of environments from turbid			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P534 / *Lincoln Laboratory*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
harbors to relatively clear open oceans. New technologies for all-electronic wide-angle beam steering in communication and ladar applications would apply to many DoD systems. ***FY 2017 Plans:*** Continuing improvements in stabilization will allow coherent combining of signals at frequencies up to 1015 Hz. Plans are to develop and field prototypes in FY 2017 and find new applications in the years to follow. An additional major thrust will increase computation at the individual pixel scale of large imagers. This, combined with the current work on improved imaging algorithms, will enable imagers that will recognize objects and movements without processing the entire image. Other algorithms under development may be implemented, which will result in revolutionary new capabilities of both visible and infrared sensors.			
Title: Radio Frequency (RF) Systems and Technologies ***Description:*** This project develops novel active and passive RF sensors, new RF communication techniques, technologies for electronic protection and electronic attack, and new system concepts. ***FY 2015 Accomplishments:*** Researchers successfully completed a novel RF compression algorithm for efficient information extraction. A second project, using a different compressed-sensing algorithm, demonstrated capability to effectively monitor millimeter-wave frequencies using minimal hardware. The Microwave Photonic Low Noise Amplifier (LNA) shows promise to reduce harmonic distortion. A Simultaneously Transmit and Receive (STAR) phased-array project built a digital noise canceller. The use of advanced Complementary Metal-Oxide Semiconductor (CMOS) devices for RF applications for Systems on Chip, ultralow power electronics, and Gallium Nitride (GaN) on Silicon push the state-of-the-art in those domains. ***FY 2016 Plans:*** Gallium nitride on silicon technology research will continue to advance and enable large, high-power, low-cost/scalable RF arrays for radar, communication and electronic warfare applications. A new effort using microjets to enhance the cooling capability of Silicon aims to provide orders of magnitude improvement for output power of high-power amplifiers and other electronics. Two space-systems efforts focused on CubeSat – scale satellites will enable the ability to deploy millimeter wave and microwave capabilities in very small form factors. Technology to simultaneously transmit and receive in a phased array will continue with the goal of 100 dB of isolation. Finally, several RF communication efforts aim to enable networking in contested environments, provide higher-security RF waveforms and use compressed sensing techniques to create more advanced, low-cost receiver capabilities. ***FY 2017 Plans:*** GaN programs will enter their final year and produce fieldable prototypes. Depending on the outcome of the FY 2016 exploratory efforts in microjet cooling of Silicon, devices will be fabricated and tested. Further expansion in the realm of small satellites and	4.100	5.120	4.623

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P534 / *Lincoln Laboratory*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
additional antenna designs will be made. Developers will seek to lower size, weight, and power for the simultaneous transmit and receive program.			
Title: Information, Computation, and Exploitation Sciences	4.600	4.706	4.461
Description: This project develops novel architectures, tools, and techniques for the processing, fusion, interpretation, computation, and exploitation of multi-sensor, multi-intelligence data.			
FY 2015 Accomplishments: Grid and cloud computing researchers continued to develop techniques for secure computing on masked data, added new security tools, integrated social media analysis tools with denser data sets, and expanded capabilities to process large sensor-derived data sets. Furthermore, the graph processing team moved from the design and simulation stage to the prototyping and demonstration stage by developing an efficient sparse memory system, sparse arithmetic logic unit, and communication engine. Sparse matrix multiplication was demonstrated using multiple commercial-off-the-shelf field-programmable gate array boards. Research into the joint audio/visual mining of uncooperatively collected video data produced improvements in the accuracy of information retrieval and expanded the ability to incorporate user feedback. The work in benchmarking military mobile ad-hoc networks created tools that enabled comparison of theoretically achievable performance of different communication techniques and protocols and has identified the throughput gains achievable through improving scheduling algorithms. Work in the covert and anomalous network discovery and detection effort expanded into the key area of network and graph control. Researchers also collected and analyzed operationally significant datasets to explore limits of detectability, and used this insight to develop and produce graph fusion and detection techniques that offer improved accuracy.			
FY 2016 Plans: Cloud computing researchers will prototype data storage and processing technologies for handling massive data for a new secure internet-of-things (IoT) initiative for military and intelligence community (IC) applications. The graph-processing program will continue and produce an initial hardware unit that will demonstrate the capability of this innovative approach. The joint audio/visual mining program will enter its last year and will culminate in a rigorous development and evaluation of cross-media search and classification techniques. The covert and anomalous network discovery and detection effort will likewise enter its last year and concentrate on utility within the DoD. A new effort will be launched in dynamic deep learning. This work will perform learning of multiple increasingly sophisticated network layers to do semantic interpretation of unstructured video / LADAR data and also demonstrate near-human-level performance on key unsolved signature detection problems. Another new multi-year effort will begin in creating an autonomous processing, exploitation and dissemination (PED) system that will operate collaboratively with human operators to significantly increase PED efficiency and effectiveness for both DoD and IC missions. In this first year, researchers will focus on developing the system architecture and will integrate key processing technologies and will reduce the burden on human operators that will set the framework in place for future autonomous operation.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P534 / *Lincoln Laboratory*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Cloud computing researchers will continue to advance the military and IC Internet-of-Things (IoT) initiative. The work will focus on (1) enhancements to secure cloud computing techniques to protect integrated IoT systems, and (2) advances in computing infrastructure to provide low latency measurement, analysis and control of IoT multi-tasking and data processing. The final year of the graph processor program will focus on integrating the processor with Lincoln's grid computing system (LLGrid), to provide users with the ability to do big-data graph analytics at an unprecedented scale and throughput. The autonomous PED program will integrate new techniques that were previously developed as part of individual analysis tool development programs, including work done under (1) the joint audio visual mining program, (2) the covert and anomalous network and discovery effort, and (3) the dynamic deep learning program. With this capability intact, the autonomous PED program will use embedded instrumentation and measurement tools to determine operational effectiveness of collaborative machine-human operations on mission scenarios that exploit autonomous advance indications and warnings. The deep dynamic learning program will also continue, with the goal of demonstrating unprecedented high-throughput detection performance on video and LADAR imagery.			
Title: Cyber Security	4.100	5.313	5.037
Description: This project develops technologies and new techniques for the protection of systems against cyber attack and exploitation. ***FY 2015 Accomplishments:*** Cyber Security development focused on better approaches to protect systems and better tools to understand vulnerabilities and exploitation strategies in both small and large-scale systems. Techniques were developed for protecting information storage, processing and communications in the cloud. Innovative techniques including multiparty computation, data provenance analysis and intra-cloud secure networking showed great promise for securing the cloud. With an enhanced private cloud testbed at Lincoln Laboratory, the applicability of these techniques for future DoD and US government cloud systems was tested. In more advanced research, a secure processor prototype demonstrated more secure computing by decrypting data and operating instructions only during a small window of time and in limited regions of the processor. Software to produce large numbers of exploitable software vulnerabilities generated data sets for assessing the performance of static and dynamic software analysis tools. Many computer and network components manufactured abroad make cyber vulnerabilities in hardware an important consideration. In FY 2015, hardware exploits were inserted into a processor and triggered externally to demonstrate multiple vulnerabilities. Vulnerabilities in software-defined radio are also being studied. ***FY 2016 Plans:*** Most of the cyber protection and evaluation efforts will continue to be advanced with the addition of a few new efforts. Efforts to protect cloud computing systems will focus on creating and demonstrating a full stack of cloud provenance services and tools. Both the software and hardware vulnerability generation efforts will continue, better spanning the space of potential			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
vulnerabilities that can occur in real systems. A cyber/EW software-defined radio will be demonstrated and new efforts in cyber secure architectures for small satellites, functional encryption, and cyber security metrics will be initiated. ***FY 2017 Plans:*** Rapid response to the evolving cyber threats along with Lincoln's particular DoD cyber expertise will guide future R&D plans. The need for understanding vulnerabilities in both the hardware and software domains is expected to continue. In the hardware domain, efforts to reduce vulnerability to foreign built computer and network components will continue. In addition, the ability of near-peers to emulate and devise EW/cyber strategies that limit U.S. capabilities will result in new mitigation strategy research. In the software domain, the increased government/DoD cloud usage will put a premium on defensive network strategies.			
Title: Biomedical Sciences and Technology ***Description:*** The Biomedical Sciences and Technology effort aids the warfighter, especially within the brain and cognitive sciences domain, with engineered biological systems and physiological monitoring for performance enhancement and injury recovery. ***FY 2015 Accomplishments:*** A 3D multi-material Bioprinter effort addressed gaps in current 3D printing technology to combine organic and inorganic materials, enabling the creation of unique structures. The design team built and tested a printer that included two high-end gantries, several print heads for printing plastic, metal and biological materials, and a motion controller system with user interface. In the Synthetic Biology domain, the Artificial Gut (ArtGut) project team designed, 3D-printed, and tested multiple prototypes to simulate what complex communities of engineered microbes would experience in the digestive tract. This effort has included creating subsystems capable of peristaltic motion, testing a wide range of 3D-printable polymer materials, and embedding oxygen sensors. The Brain-Computer Interface (BCI) effort is directed toward the ultimate goal of allowing humans to consciously control computers with thoughts. This project developed a noninvasive cognitive assessment platform and a series of tests that permits understanding of subject's cognitive state based on purely mental tasks such as simply envisioning the manipulation of object rather than physically moving an object. A new effort was also launched to develop a non-contact ultrasound system for volumetric imaging. This effort employs laser excitation and sensing arrays for high-resolution volumetric imagery, which has the potential to monitor bone health, assess traumatic brain injury, and diagnose internal bleeding. In the pursuit of identifying neural correlates of learning, the Functional Brain Network Analysis effort characterized neural connectivity by collecting longitudinal EEG data during task learning. This data will be utilized to create a brain map and uncover fundamental properties governing changes in neural connectivity while learning. Two projects are developing software modules for tracking and analyzing multimodal markers of individual health and performance to assess and understand DoD-relevant driving biomedical problems, including cognitive disorders such as traumatic brain injury and depression. ***FY 2016 Plans:***	3.335	3.320	3.147

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P534 / *Lincoln Laboratory*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The 3D multi-material Bioprinter effort will conclude by developing the capability to print materials that will assist in cartilage repair. The ArtGut program will also conclude and develop a new microfluidic system to isolate microbial strains and attempt to improve on current microbial culture methods. The Non-contact Ultrasound program is expected to have preliminary results. The Function Brain Network Analysis study will evaluate functional neural connectivity and extend methods to characterize temporal dynamics of connectivity patterns. Four new efforts are anticipated, covering a wide range of topics. One project aims to more effectively restore muscle loss after injury by re-programing the fibroblasts and fibrotic scar cells by re-awakening muscle-forming genes using proteins and drugs. A second project will use brain-based behavioral measures and neural-model parameters that predict severity of a disorder and stress, as well as predict the effect on cognitive performance. A cellular-resolution brain-mapping project will utilize data gathered from a novel microscale brain mapping method to build a big-data management framework for brain imagery and develop automated neuron-tracing algorithms. This program has the long-term goal of creating large scale mapping for human brains to diagnose and treat conditions such as Alzheimer's and PTSD. ***FY 2017 Plans:*** The volumetric-muscle-loss project will conclude this year with an in vitro demonstration. The Cellular-Resolution Brain Mapping program is expected to produce preliminary capabilities to map the brain network topology. The project portfolio will see increasing emphasis on cognitive-science-related projects and diminished focus on physiological monitoring, in keeping with emergent science trends and anticipated DoD needs.			
Title: Autonomous Systems ***Description:*** Autonomous systems technologies with the objective of developing mobile, autonomous, robotic platforms, sensors and algorithms that support key capabilities needed for a wide range of defense applications. ***FY 2015 Accomplishments:*** Autonomous systems efforts progressed in four key areas. In the first area, the fabrication and testing of the digital-vision-sensor readout electronics and detector-tier for real-time autonomous low-altitude optical navigation was completed and sensor hybridization and camera firmware development was initiated. After demonstrating sidecar control of the small-UAS autopilot, the team collected imagery from a small-UAV using off-the-shelf imagers as a baseline. In the second area, oceanographic flow and ship wake models were integrated into a dynamic path planner to enable safe and energy-optimized UUV operations in the complex environments in the vicinity of ships. At-sea demonstrations were executed to validate the oceanographic forecasting and energy-optimized path plans in a realistic environment. In the third area, the team developed a target tracking framework that can provide the sustained visual cue needed for a UAV to follow a ground target and a dynamic platform-and-sensor planning framework to improve observation distance and view diversity of the UAV's target to support identification. In the final area, which is developing algorithms for data-driven autonomy, involved applying the Coreset video-ranking software library to video data	2.100	3.377	3.201

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
recorded from a tactical UAV. The team utilized offline data processing to generate 3D maps from the 2D video streams of both the entire frameset and evaluated the reduced-size Coreset and geo-registration accuracy. ***FY 2016 Plans:*** The autonomous system hardware efforts will continue and will enter a demonstration phase of development. Developers will complete the integration of the digital vision sensor for fast autonomous airborne navigation and demonstrate the capability in a flight test. Additionally, the UUV effort will continue with testing in an autonomy simulator and real-time processor and result in a demonstration at sea. For the data-driven autonomy effort, the team will adapt the Lab Coreset video software library to static-object change detection and moving-vehicle tracking, enabling a demonstration exercise that is relevant to the DoD. The Lab will also be launching a new effort to develop a novel silent UAV propulsion system that will offer significant efficiency advantages over traditional propulsion methods. A new effort to develop coordination of multi agent UAVs will enable decentralized planning under real-world communication constraints. Furthermore, development of a new biomimetic sonar system that mimics dolphin sonar will enable improved autonomous object detection, localization and classification. ***FY 2017 Plans:*** Research will continue to improve current autonomous system capabilities for air, land, and sea. These improvements will encompass both hardware advancements, such as the on-going silent propulsion system, as well as algorithm improvements for swarm and multi-agent coordination. The Lab expects continued exploration of underwater and cross-domain problem sets.			
Title: Quantum System Sciences ***Description:*** Quantum System Science develops technologies that support sensing, communication and computation using quantum information. ***FY 2015 Accomplishments:*** Quantum computing, which has the potential of exponentially faster computation for some important problems (e.g., in cryptography), includes efforts on superconducting qubits, theory of qubits, and computing with trapped ion qubits. Trapped-ion work focused on a more scalable approach using microchips. Quantum coherent operations were demonstrated in individual Sr+ ions using 674-nm-wavelength light routed in and emitted from silicon nitride waveguides and couplers lithographically integrated within a linear surface-electrode ion trap chip. Planar superconducting qubits showed broad frequency tunability, strong anharmonicity, high reproducibility, and coherence times in excess of 40 μs. A quantum communication effort developed technology to support a new protocol for high-rate, quantum-protected communication that avoids the need for a separate, slow, key exchange step. These technologies included a high-gain optical-parametric-amplifier-based two-mode quantum receiver and a multi-channel, high-rate single photon counting receiver architecture with photon number resolution. Finally, a quantum sensing effort advanced technology based on nitrogen vacancies in diamond for sensing magnetic fields. Initial record-sensitivity experiments in FY 2014 were further advanced in FY 2015 by demonstrating approaches to align the field measurements to a single crystal axis, to remove temperature effects from the measurements and to further improve the sensitivity. All of these	4.300	4.772	4.523

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
quantum sciences efforts are closely connected to work on MIT campus through collaborations that involve the MIT faculty, who are world-experts in these fields, their graduate students, who work collaboratively in both locations, and a dedicated 40-km fiber link for quantum communication experiments. ***FY 2016 Plans:*** Plans include improved scalability and the implementation of quantum error correction techniques. The superconducting qubit work will continue to advance the state-of-the-art for the superconducting qubits themselves, particularly for long-term, gatebased quantum computing architectures. Initial qubit computing using trapped ions on a microchip will be demonstrated. Development of modulators suitable for the wide range of wavelengths necessary to address the ions (and many other applications) will continue. The ultra-sensitive magnetometer using diamond will produce full vector measurements. A new protocol for high-rate, quantum-protected communication that avoids the need for a separate, slow key-exchange step will be demonstrated. ***FY 2017 Plans:*** The quantum communication protocols will be tested in the field over a fiber link between Lincoln Laboratory and MIT campus. In addition to continued advances in superconducting qubits, trapped ions, quantum-protected communication and quantum magnetometry, additional efforts will be made to advance quantum algorithms. As the basic technology components and the path to scalable quantum systems are demonstrated, additional work on algorithms for quantum computation and quantum communication will become increasingly important to define future system architectures.			
Title: Novel and Engineered Materials ***Description:*** Invent, de-risk, and establish materials and processes that can make transformative impact on the nation's national security needs. ***FY 2015 Accomplishments:*** An important frontier in new materials is the ability to make heterogeneous materials on very small size scales (e.g., nanomaterials) with properties that are more than just a mixture of the component materials. A collaboration with Harvard University developed low-RF-loss 3D-printable polymers with high feature resolution. A printable A-B-A triblock copolymer, which has nanoscale spherical occlusions, rivals the best-in-class dielectric in initial tests of a printed 29-34 GHz band pass filter. Important milestones of building structures with 8 μm resolution and 0.1 μm RMS surface roughness were demonstrated. A second effort investigated the applicability of transition metal dichalcogenide (TMD) materials for flash memory and room-temperature solid-state qubits (logical units of quantum calculation). Academic collaborators at MIT and Carnegie Mellon University helped grow and characterize TMD films with 300 nm spatial resolution using photoluminescence (PL) to provide detailed maps of alloy composition, heterostructure overlap, and defects. The team compared and evaluated different growth techniques of other materials (MoS2, WS2, WSe2) using Raman, PL spectroscopy, and atomic force microscopy (AFM). ***FY 2016 Plans:***	1.700	2.796	2.650

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The low-RF-loss 3D printing project will continue with the development of polymer/inorganic composite ink for increased dielectric constant. In addition, the program will fabricate RF devices by 3D printing both conductor and dielectric materials concurrently, demonstrating dielectric tuning and multiple permittivity in a single device. Studies of TMD materials and work toward prototyping of valleytronic flash memory and room-temperature solid-state qubits will continue. Three new programs will be launched. The 3D Printing of Metal-Ceramic Microlattices project will create transformative structural materials using architected designs that provide extreme stiffness-to-density ratios. A key goal is to create a ductile material with 1/10th the weight of aluminum and the stiffness of fiberglass. A second new project seeks to improve on semiconductor device architecture by creating a light-weight, flexible fiber with the functionality of wafer-based devices. Fibers containing multiple materials have demonstrated applicability in many areas; a major new capability would combine optical and electronic properties in the fiber to develop fibers with designed photonic bandgaps. ***FY 2017 Plans:*** A continuing area of focus will be in additive manufacturing envisions materials with properties that are designed to exhibit desired mechanical, thermal, electro-optical performance in a number of devices of interest to the DoD, including in the RF domain. As the resolution improves, high-performance devices for mm-wave applications (up to 100 GHz) will be printed. Lightweight structural materials will be deployed in low-SWaP systems, such as in a UAV or Cubesat payload. Advances in designing and drawing of composite fibers will result in scintillators for gamma and neutron detection, for example.			
Title: Missile Defeat-X Lab ***Description:*** X-LAB in support of Missile Defeat will conduct an experiment with the goal of demonstrating a multi-INT threat defeat framework using a rapid insertion of new data sources, new analytics and pluggable libraries of analytics and visualization tools from developer community (Universities, Industry, Government Labs, FFRDCs). The project will work towards fusion across unclassified and classified data for the Joint Staff organization. ***FY 2015 Accomplishments:*** Initial planning and technical interchange meetings were conducted, initial demonstration use cases identified. Initial work identified which tools under development by AFRL, ARL, LLNL, Radiant Blue, and MIT LL could be used. Performance characterization of architecture elements was conducted. The initial emphasis on commercial and open source data. ***FY 2016 Plans:*** In FY 2016 leveraging prior year funds, X-Lab will deploy the updated infrastructure, create a knowledge base, ingest data from selected data sets / target events, finalize interface protocols and formats among participants, develop analytic algorithms and perform a capability assessment.	3.700	0.000	-
Accomplishments/Planned Programs Subtotals	40.135	41.994	39.576

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / *Lincoln Laboratory*	Project (Number/Name) P535 / *Technical Intelligence*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P535: *Technical Intelligence*	-	9.274	8.931	8.693	-	8.693	5.453	6.709	6.807	6.924	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Technical Intelligence Program provides global science and technology (S&T) awareness and context in order to assist Defense decision-makers plan for an uncertain future. The program uses intelligence-based and open-source information to characterize today's global S&T environment, exploiting novel technology watch and horizon scanning (TW/HS) tools to identify nascent and disruptive technologies that will shape tomorrow's future. The program complements this with tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations for emerging and disruptive technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Technical Intelligence	9.274	8.931	8.693

Description: The Technical Intelligence Program provides global science and technology (S&T) awareness and context in order to assist Defense decision-makers plan for an uncertain future. The program uses intelligence-based and open-source information to characterize today's global S&T environment, exploiting novel technology watch and horizon scanning (TW/HS) tools to identify nascent and disruptive technologies that will shape tomorrow's future. The program complements this with tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations for emerging and disruptive technologies.

FY 2015 Accomplishments:

In FY 2015, the Technical Intelligence program supported efforts characterizing today's global S&T environment, exploited novel TW/HS tools to identify nascent and disruptive technologies that could shape tomorrow's future, and developed tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically:

• JASON Program: Supported focused technical assessments on defense relevant problems. The topic areas included: Defense against Hypersonics, Missile Defense, Science-Based Explosive Design, and Impacts of Emerging Biological Capabilities.

• Technology Watch and Horizon Scanning (TW/HS) Tool Exploitation: Sponsored efforts on exploiting data analysis and TW/HS tools to identify existing and unrecognized patterns, to provide non-obvious relationships using open source information, and to develop a better understanding of how to incorporate private-sector data analysis regarding technology development, trends, and potentially disruptive developments.

• Technical Assessment Program: Sponsored multiple technical assessment activities that included integrated photonics, autonomy, and technology forecasting.

FY 2016 Plans:

In FY 2016, the Technical Intelligence program is funding efforts characterizing today's global S&T environment, exploiting novel TW/HS tools to identify nascent and disruptive technologies that will shape tomorrow's future, and developing tailored technical

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P535 / *Technical Intelligence*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically: • JASON Program: Supporting focused technical assessments on defense relevant problems. The potential topic areas include: Artificial Intelligence, defending against cooperating UAVs, and micro-satellite. • Technology Watch and Horizon Scanning (TW/HS) Tool Exploitation: Funding efforts on exploiting data analysis and TW/HS tools, to identify existing and unrecognized patterns, and to provide non-obvious relationships using open source information. The program is investigating improvements in query generation, and metrics and validation of TW/HS algorithms. • Technical Assessment Program: Working on multiple technical assessment activities supporting the community of interest topic areas, including Artificial Intelligence and Internet of Things, and may include additional topics such as cognitive neuroscience, and optics and directed energy. ***FY 2017 Plans:*** In FY 2017, the Technical Intelligence program will continue to support efforts characterizing today's global S&T environment, exploiting novel TW/HS tools to identify nascent and disruptive technologies that will shape tomorrow's future, and developing tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically: • JASON Program: Will support focused technical assessments on defense relevant problems. The potential topic areas include: advanced electronics, autonomy, electronic warfare and protection, energy and power technologies, engineered resilient systems, space, sensor and processing systems, and human systems. • Technology Watch and Horizon Scanning (TW/HS) Tool Exploitation: Will continue to sponsor efforts on exploiting data analysis and TW/HS tools with the goal of having an operational TW/HS toolkit available to DoD researchers and scientists. The program will identify outreach opportunities to inform and train DoD S&T organizations in the usage of analytical tools and methodologies to support "in-house" decision making and expand organizational knowledge into emerging technology areas of strategic interest. • Technical Assessment Program: Will sponsor multiple technical assessment activities that support the community of interest topic areas, which may include advanced computing, cognitive decision-support tools, and non-traditional sensing.			
Accomplishments/Planned Programs Subtotals	9.274	8.931	8.693

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602234D8Z / *Lincoln Laboratory*	**Project (Number/Name)** P535 / *Technical Intelligence*

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing
P227: *Applied Research for the Advancement of S&T Priorities*	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Applied Research for the Advancement of Science and Technology (S&T) Priorities program element (PE) enables the early launch of S&T applied research projects to shape Components' investments. The PE is oriented toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements, and to translate promising research into solutions for military needs. Efforts are situated within the Department of Defense (DoD) S&T priorities and focus areas, and will include feasibility evaluations and non-system specific technology efforts. Investigations conducted in this PE facilitate concept exploration efforts and studies of alternative concepts. Efforts are formulated and managed by teams of subject matter experts drawn from the Office of the Secretary of Defense, the Military Services, and Defense Agencies. The PE also provides support to the S&T Communities of Interest.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	41.905	48.226	48.088	-	48.088
Current President's Budget	40.168	48.131	42.206	-	42.206
Total Adjustments	-1.737	-0.095	-5.882	-	-5.882
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.978	-			
• Realignment for Higher Priority Programs	-	-	-5.556	-	-5.556
• FY15 Reprog. for Cancelled Account	-0.016	-	-	-	-
• Other Reprogrammings	-0.743	-	-	-	-
• FFRDC Reduction	-	-0.095	-	-	-
• Economic Assumptions	-	-	-0.326	-	-0.326

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	Project (Number/Name) P227 / *Applied Research for the Advancement of S&T Priorities*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P227: *Applied Research for the Advancement of S&T Priorities*	-	40.168	48.131	42.206	-	42.206	49.271	53.038	53.773	54.888	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Applied Research for the Advancement of Science and Technology (S&T) Priorities program element (PE) enables the early launch of S&T applied research projects to shape Components' investments. The PE is oriented toward the design, development, and improvement of prototypes and new processes to meet general mission area requirements, and to translate promising research into solutions for military needs. Efforts are situated within the seven DoD S&T priorities and focus areas, and will include feasibility evaluations and non-system specific technology efforts. Investigations conducted in this PE facilitate concept exploration efforts and studies of alternative concepts. Efforts are formulated and managed by teams of subject matter experts drawn from the Office of the Secretary of Defense, the Military Services, and Defense Agencies. The PE also provides support to the S&T Communities of Interest.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Applied Research for the Advancement of S&T Priorities	28.136	33.181	30.000

Description: The S&T priorities include: Electronic Warfare (EW), Human Systems, Counter Weapons of Mass Destruction (CWMD), Engineered Resilient Systems (ERS), Data to Decisions (D2D), Autonomy, Quantum Science and Engineering, and Cyber Security.

FY 2015 Accomplishments:
Continued efforts within the ERS, Autonomy, and D2D areas. Initiated program in Quantum Science and Engineering. Accomplishments included:

ERS:
- Released Version 1.1 and 1.2 ERS Architecture
- Developed lifecycle cost models that address the entire life of Air Force unmanned platforms
- Improved visualization and automated tradespace reduction techniques
- Used hi-fidelity, high-performance computing simulations to examine rotor blade performance on cargo rotorcraft
- Created a standard modeling library for the retention and use of UH-60 helicopter data
- Launched second release of ERS Knowledge Management environment

Autonomy:
- Developed virtual terrain and simulated entities to increase the complexity of autonomous squad behavior
- Constructed three rotorcraft capable of autonomous and stable flight; demonstrated in simulation the software to perform mapping, task allocation, trajectory planning, and frontier identification

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	**Project (Number/Name)** P227 / *Applied Research for the Advancement of S&T Priorities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Validated, refined, and further developed estimators of trust in Autonomy - Demonstrated proof-of-concept Tactical Battle Management in virtual simulation D2D: - Integrated live text analytics with signals analysis - Integrated target queuing framework from stored text data - Integrated text and signals analysis into cloud architecture - Demonstrated overall system performance Quantum Science and Engineering Program: - Launched tri-Service effort to develop scalable network technologies and accelerate critical building blocks for quantum networks ***FY 2016 Plans:*** Continue concept exploration efforts that focus on the S&T priority areas. In FY 2016, the challenge areas within the priorities include: Autonomy: - Demonstrate trust optimization in Autonomy - Automate learning of tactics to enhance validity of air combat effectiveness evaluation - Enable manned and unmanned synchronized teaming in tactical reconnaissance, surveillance, and target acquisition missions Quantum Science and Engineering Program - Continue efforts on scalable, integrated quantum memory nodes - Continue efforts on two-node, quantum network with memory - Continue efforts leading to demonstration of secure application across a quantum network Cyber: - Enhance mission assurance and effectiveness - Develop techniques for secure operations - Build upon cyber technology foundations ***FY 2017 Plans:*** Continue concept exploration efforts that focus on the S&T priority areas. In FY 2017, the challenge areas within the priorities include:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	**Project (Number/Name)** P227 / *Applied Research for the Advancement of S&T Priorities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Quantum Science and Engineering Program - Continue efforts on scalable, integrated quantum memory nodes - Continue efforts on two-node, quantum network with memory - Continue efforts leading to demonstration of secure application across a quantum network Cyber: - Enhance mission assurance and effectiveness - Develop techniques for secure operations - Build upon cyber technology foundations			
Title: S&T Communities of Interest ***Description:*** The S&T Communities of Interest task facilitates cooperation and collaboration among Components and optimizes development of selected S&T efforts across the DoD enterprise. Efforts include technology roadmapping, and the integration of technology planning to Department strategic objectives. Select technology areas are examined by the Communities of Interest, and projects are initiated to address gaps or opportunities. ***FY 2015 Accomplishments:*** Continued to provide technical support to Communities of Interest. Initiated a new set of two-year projects to address technology opportunities or gaps identified by Communities of Interest. Concluded seven projects initiated in FY 2014: Accelerated Materials Discovery and Delivery; Reusable Military Space Launch Concepts; Pedigree-based Training/Licensure of Autonomous Systems; Context-aware Information Retrieval for Decision Support; Cyber Operational Architecture Training System; Integrated Satellite Communications (SATCOM) Tactical Resiliency; and Technology Investigation and Assessment for the Development of Digital Read Out Integrated Circuits. ***FY 2016 Plans:*** Continue to provide technical support to Communities of Interest. Conclude projects initiated in FY 2015, and select a new set of projects to address gaps identified by Communities of Interest. ***FY 2017 Plans:*** Continue to provide technical support to Communities of Interest. Conclude projects initiated in FY 2016, and select a new set of projects to address gaps identified by Communities of Interest.	12.032	14.950	12.206
Accomplishments/Planned Programs Subtotals	40.168	48.131	42.206

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602251D8Z / *Applied Research for the Advancement of S&T Priorities*	**Project (Number/Name)** P227 / *Applied Research for the Advancement of S&T Priorities*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Project performance metrics specific to each effort are identified in the project plans established by the program leads and the Communities of Interest. Individual project success will be monitored through these metrics.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	17.748	13.701	12.183	-	12.183	15.043	15.323	15.535	15.840	Continuing	Continuing
P003: *Cyber Applied Research*	-	17.748	13.701	12.183	-	12.183	15.043	15.323	15.535	15.840	Continuing	Continuing

A. Mission Description and Budget Item Justification

Our military forces require resilient and reliable networks, computer systems, and embedded systems to conduct effective operations. However, the number and sophistication of threats in cyberspace are rapidly growing, making it critical to improve the cyber security of Department of Defense (DoD) systems to counter those threats and assure our missions. The Cyber Applied Research program focuses on innovative and sustained research in both cyber security and computer network operations to: develop new concepts to harden key network and computer components, design new resilient cyber infrastructures, increase the military's ability to fight and survive during cyber attacks, disrupt nation-state level attack planning and execution, measure the state of cyber security, explore and exploit new ideas in cyber warfare for agile cyber operations and mission assurance, along with protect tactical networks, weapons systems and platforms.

The Cyber Applied Research program builds upon existing basic and applied research results. The program focuses on integrating computer network defense and computer network operations, addressing joint problems in cyber operations, and filling capability and technology gaps as identified in the 2012 Cyber Priority Steering Council Science and Technology (S&T) Roadmap, the 2013 Cyber S&T Capability Gap Framework, and other assessments conducted by the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)). Progress and results are reviewed by the DoD Cyber S&T Community of Interest (COI). New efforts will align with DoD Cyber Strategy and emerging U.S. Cyber Command (USCYBERCOM) mission requirements.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	14.979	13.727	12.966	-	12.966
Current President's Budget	17.748	13.701	12.183	-	12.183
Total Adjustments	2.769	-0.026	-0.783	-	-0.783
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.411	-			
• Realignment for Higher Priority Programs	-	-	-0.689	-	-0.689
• FY15 Reprog. for Cancelled Account	-0.006	-	-	-	-
• Other Reprogrammings	3.186	-	-	-	-
• FFRDC Reduction	-	-0.026	-	-	-
• Economic Assumptions	-	-	-0.094	-	-0.094

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602668D8Z *I Cyber Security Research*

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602668D8Z / *Cyber Security Research*	Project (Number/Name) P003 / *Cyber Applied Research*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P003: *Cyber Applied Research*	-	17.748	13.701	12.183	-	12.183	15.043	15.323	15.535	15.840	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program focuses on science and technology (S&T) to support integrating computer network defense and computer network operations, addressing joint challenges in cyber operations, and filling capability and technology gaps as identified in the 2015 Cyber Defense Strategy, Cyber Community of Interest (COI) S&T Roadmap, the 2013 Cyber S&T Capability Gap Framework and other assessments conducted by the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)). Progress and results are reviewed by the DoD Cyber S&T COI.

Beginning in FY 2013, the program expanded research in cyber command and control (C2) to provide warfighters and commanders new situational awareness, course of action analysis, cyber operational agility and cyber mission control. This research will include protection of tactical networks, weapons systems and platforms. Beginning in FY 2014, efforts were aligned to U.S. Cyber Command (USCYBERCOM) mission assurance.

The six technical thrust areas of the Cyber Security Research Program are:

Foundations of Trust
Resilient Infrastructure
Agile Operations
Assuring Effective Missions
Cyber Modeling, Simulation, and Experimentation (MSE)
Embedded, Mobile, and Tactical Environments (EMT)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Foundations of Trust	1.742	1.425	1.270
Description: Develop approaches and methods to establish known degrees of assurance that devices, networks, and cyber missions perform as expected, despite attack or error. This technical area encompasses all aspects of the assessment, establishment, propagation, maintenance, and composition of trust relationships between devices, networks, and people.			
FY 2015 Accomplishments: This program funded the "Countermeasure to Commercial Off-The-Shelf Products" project, executed by the Air Force Research Laboratory (AFRL), to develop detection algorithms for malicious Universal Serial Bus (USB) firmware/hardware. A number of countermeasures were developed to mitigate hardware and firmware based attacks. This was demonstrated in a fully operational protection system that prevented, detected, and responded to supply chain attacks.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
This program funded the Research Directorate of the National Security Agency (NSA) to develop a non-signature based capability to detect malicious code on cyber systems with high accuracy. This game changing approach to signature-free malware detection introduced a detection capability for defending against zero-day attacks. A new project initiated in FY 2015 focused research on Graphics Processing Unit (GPU) based image processing. During this fiscal year, this effort conducted experimentation and automated analytical techniques for the assessment of trustworthiness of DoD systems and components. Another new project funded in FY 2015 supported the tri-service execution of a five-eye international effort, under the Technical Cooperation Program's Cyber Strategic Challenge Group. This effort identified gaps in current vulnerability assessment tools in an effort to provide full coverage of the vulnerability landscape. These coverage gaps represent a demonstrated need for advanced cyber security tools. Through this program, the service laboratories will conduct research to develop/procure tools to address these gaps. ***FY 2016 Plans:*** This program will continue to fund the NSA to improve image processing computation by identifying and categorizing steps to improve GPU acceleration. This will help build a focused library of GPU tools. Another task will focus on building sets of advanced technique modules that will enhance capabilities of the meta-learning framework. ***FY 2017 Plans:*** Continuing efforts in FY 2017 will support developing approaches and methods to establish known degrees of assurance. Efforts this fiscal year will continue research to develop a system for combining many data structure extractors into one structure extractor (a process called "fusion"). Research will be conducted to continue furthering the capabilities of the meta-learning framework and expanding the library of GPU tools.			
Title: Resilient Infrastructure ***Description:*** Entails the ability to withstand cyber attacks, and to sustain or recover critical functions. A resilient infrastructure has the ability to continue to perform its functions and provide its services at required levels during an attack. The objective in this area is to develop integrated architectures that are optimized for their ability to absorb (cyber) shock, and recover in a timely fashion to a known secure state with well-defined performance characteristics. Resilient Algorithms and Protocols address novel protocols and algorithms to increase the repertoire of resiliency mechanisms available to the infrastructure and architecture. Research is needed to develop resiliency at lower levels with specific algorithms and protocols to support higher-level resilient architectures. ***FY 2015 Accomplishments:***	2.720	0.940	0.950

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
This program funded the Naval Research Laboratory (NRL) and the Office of Naval Research (ONR) to address a number of critical gaps in Resilient Infrastructure. NRL executed a number of projects that improved the resiliency of tactical networks. The “Cross-Layer Resilient and Adaptive Networking" project enhanced the resilience of tactical wireless networking by using cross-layer principles to mitigate attacks through enhanced layer 1 agility. The use of cross-layer techniques helped influence higher layers which in turn helped identify advanced threats/attacks. The project developed methods for increasing resiliency of large scale tactical networks while enabling increased mobility. Development of the project offered technology transfer paths looking to increase model applicability to various types of ad-hoc and mesh networks. The other NRL executed projects, “Tactical Assured Information Sharing,” designed a framework for secure modularization and virtualization of nodes and networks. This high assurance software framework was highly configurable and executed trusted information flow. Software components were later implemented onto the Navy’s Network Pump-II security appliance, a cross domain solution (CDS). Under the newly funded FY 2015 “Tactical Platform Resiliency” project, ONR executed the development of cyber resiliency techniques and tools against attacks on known classes of cyber vulnerabilities. These vulnerabilities are applicable to Cyber Physical Systems (CPS) and, specifically, to hull, mechanical and electrical (HM&E) systems. The work has been assessed by a tri-service review board which addressed gaps in the protection of cyber physical systems controlling critical infrastructure. Through the modification and implementation of fault tolerant tools, a design has been developed that will effectively harden critical control systems from cyber disruption. Additionally a number of funded projects executed by Johns Hopkins University Applied Physics Laboratory (JHU/APL) and NRL addressed critical gaps in resilient infrastructure by maturing technologies through accelerated transition to operational partners. The first effort funded the “Control Flow Integrity Monitoring” project for transition to NSA, Department of Homeland Security (DHS), Defense Information Systems Agency (DISA), and the CERT Division of the Software Engineering Institute (SEI). This effort detected return-oriented programming attacks using record and replay technology. The technology enabled the rapid detection of zero-day attacks that bypass all modern defenses, eliminating the effectiveness of a large class of exploits. The second funded project executed by JHU/APL matured “System Cloaking Defense through Deception” technology to present decoys to adversaries and sense their presence and activities. A major impact of the project raised attacker workloads, confusing, delaying, and disrupting an adversary’s ability to execute exploitation operations. System Cloaking has been planned to transition to ONR, Army Cyber (ARCYBER), Marine Force Cyber (MARFORCYBER) and DHS. The last funded project was executed by NRL to mature and transition the “Network Pump-II.” Pump-II is a low-cost, high-throughput, government-off-the-shelf cross-domain solution. Transitions are planned to a number of programs of record, including the MQ-4C Triton unmanned aircraft			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
system (UAS) program, Navy's Program Executive Office Integrated Warfare Systems (PEO IWS) programs, and Air Force's Defense Cyber Program. ***FY 2016 Plans:*** A number of the funded projects will continue development through FY 2016, to include research executed under ONR for the "Tactical Platform Resiliency" project. ONR will improve the design and robustness of the variant fault tolerant tools used to harden critical control systems. The work will also design and develop capabilities to monitor and autonomously remove malicious code, commands and data from compromised networks, while preparing experimental frameworks for demonstration. The projects that have been designed to accelerate transition to operational partners will continue maturing capabilities, inhibiting advanced threats, improving Technology Readiness Level (TRL), and exploring transition opportunities. The involvement of committed customers in the transition process will accelerate maturation of the technology. Under the "Control Flow Integrity Monitoring" project, JHU/APL plans to increase the amount of information that it collects to drive improvements. Under the "System Cloaking" project, JHU/APL will work with ONR, ARCYBER, MARFORCYBER and DHS to tailor the product to customer needs. The NRL "Network Pump-II" project will work to improve on its TRL level, moving it closer to TRL 8. ***FY 2017 Plans:*** In FY 2017, ONR efforts under the "Tactical Platform Resiliency" project will develop methods and techniques for furnishing resiliency on critical real-time control systems against cyber-attacks. Additionally, ONR will work to experiment and evaluate resilience techniques through ONR Small Business Innovation Research (SBIR) performers. The projects that have been designed to accelerate transition to operational partners will continue maturing capabilities, inhibiting advanced threats, improving TRLs, and exploring transition opportunities.			
Title: Agile Operations ***Description:*** Explore new methods and technologies to dynamically reshape cyber systems as conditions/goals change, in order to escape harm, or to manipulate the adversary. These capabilities present technology challenges in the areas of Autonomic Cyber Agility and Cyber Maneuver. Autonomic Cyber Agility covers several forms of agility for example, as cyber infrastructures increase in scale and complexity, there is an urgent need for autonomous and agile mechanisms to reconfigure, heal, optimize, and protect defensive and offensive cyber mechanisms. Cyber Maneuver is a new way to manage systems dynamically in a cyber operation. It is a set of emerging methods for maintaining defensive or offensive advantage in cyber operations. It entails developing mechanisms that enable goal-directed reshaping of cyber systems. Cyber Maneuver encompasses: reallocation (repurposing a device or platform), reconfiguration (changing the way a system performs a task), and repositories (altering the operating state in a logical or physical topology). ***FY 2015 Accomplishments:*** This program funded the "Cyber Agility and Maneuver" project, executed by AFRL, to design distributed systems architectures and service application polymorphism. The work leveraged cyber agility, maneuver technology, and laboratory/experimentation	1.217	0.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
facilities to develop metrics and evaluate effectiveness against sophisticated attack types such as the Advanced Persistent Threat (APT). The project helped quantify metrics with which DoD could build, buy, configure, or maintain computer network defense (CND) capabilities to thwart certain classes of APTs and other classes of threats. Under the project AFRL collaborated with the Communications-Electronics Research, Development and Engineering Center (CERDEC) on their MORPHINATOR program with plans to share prototypes. In addition the work that was developed under "Cyber Agility and Maneuver" has been adopted into a Joint Service/Agency "Moving Target Defense (MTD) and Agility for Cyber Operations" collaboration working group. This in turn helped to develop automated reasoning techniques for executing courses of action, which was incorporated into the Air Force Rapid Acquisition Course of Action and Developmental Planning processes. ***FY 2016 Plans:*** Projects are concluding; the program is out briefing DoD stakeholders and transitioning efforts into relevant programs.			
Title: Assuring Effective Missions	6.015	4.476	3.675
Description: Develop the ability to assess and control the cyber situation within a military mission context. While the focus in cyber research is often placed on individual technologies, how these technologies work toward an effective mission is critical for the DoD. The objective of Assuring Effective Missions presents technology challenges in the areas of Cyber Mission Control and Effects at Scale. Cyber Mission Control covers the ability to orchestrate cyber systems to achieve an overarching mission goal by developing tools and techniques that enable models of cyber operational behaviors (cyber and kinetic) to determine the correct course of action in the cyber domain. To perform dynamic analysis of asset criticality and course of action analysis alternatives, there is a critical need for tools that can map information technology assets to missions and use modeling and simulation, or other techniques. Inherent in Cyber Mission Control is the ability to automatically derive and fuse information about the characteristics of information technology systems in a manner that allows us to describe, analyze, observe, and control the operation of information technology components. A key goal of this research area is to have tools that enable commanders to assess and direct different information technology maneuvers in conjunction with mission actions. Effects at Scale encompass full spectrum challenges that intersect with cyber becoming a new full-fledged domain of warfare. ***FY 2015 Accomplishments:*** This program funded projects executed by AFRL, CERDEC and NRL to address a number of gaps in Assured Effective Missions. AFRL's "Cyber Command & Control" project devised metrics to support development and maintenance of Computer Network Defense (CND) capabilities to thwart certain classes of APT. The effort created algorithms to identify and optimally configure critical cyber assets to assure effective missions. As a result, the Mission Assurance Framework developed under the project was applied to the Joint Space Operations Center (JSpOC) and the National Reconnaissance Office Operations Center (NROC). Another AFRL executed project, "Cyber Agility and Maneuver Characterization," assessed the effectiveness of agility mechanisms and moving target techniques against APTs. The work created real-world examples of mission and adversarial tasks that			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
culminated into a characterization of their benefits and limitations. The characterizations were then used to design a generic model/process to assess agile network defenses that measured moving target defense capabilities. NRL's "Situational Awareness through Network Science" project validated and extended machine intelligence techniques and theories for cyber application. Through the use of machine learning techniques, anomalous traffic patterns were identified to form an enhanced situational awareness picture to benefit network defenders. The program initiated a tri-service effort, led by CERDEC, called the "Defensible Offensive Cyber Operations (OCO) Architecture and Cyber Situational Awareness" project in FY 2015. FY 2015 efforts developed agility metrics and evaluated test environments to gauge the utility of agility maneuvers. The results were used to validate the ability to defend OCO architecture. Another tri-service program funded in FY 2015 supported the five-eye international effort, the Technical Cooperation Program's (TTCP) Cyber Strategic Challenge Group Project. This funding primarily augments existing S&T investments to make them interoperable with other nations TTCP contributions through the Canadian ARMOUR cyber framework to maximize potential leverage of TTCP investment. Additionally, this program funded the maturation of JHU/APL "Pointillist" capability. "Pointillist" provides easy-to-use rapid deployment Graphical User Interface configurations that support specialized use cases such as by the Cyber Protection hunt teams. This effort enables hunt teams to visualize graph data (for example network data flows) in real-time to rapidly identify and respond to adversaries. This effort was transitioned to MARFORCYBER. ***FY 2016 Plans:*** The "Defensible OCO Architecture and Cyber Situational Awareness" project will continue FY 2015 efforts and begin development of a cloud-based defense architecture system. ***FY 2017 Plans:*** During FY 2017, the "Defensible OCO Architecture and Cyber Situational Awareness" project will test the prototype cloud-based defense architecture. Upon successful completion of the testing, existing cyber situational awareness tools will be integrated and implemented into the OCO architecture.			
Title: Cyber Modeling, Simulation & Experimentation (MSE) ***Description:*** Develop modeling and simulation capabilities that are able to sufficiently simulate the cyber environment in which the DoD operates and enable a more robust assessment and validation of cyber technology development. There are two technical challenges associated with cyber MSE: 1) Cyber Modeling and Simulation, and 2) Cyber Measurement. Cyber Modeling and Simulation seeks to develop tools and techniques that enable analytical modeling and multi-scale simulation of complex cyber systems. Cyber Measurement develops cyber experimentation and test range technology to conduct controlled, repeatable	2.336	2.100	2.168

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
experiments, providing the ability to track the progress of cyber research investments in a quantitative fashion. This area explores new analytical methodologies, models, and experimental data sets to establish metrics to measure a system's state of security, apply the scientific method to establish the foundations of a framework in which cyber security research can be conducted, to test hypotheses with measurable and repeatable results, and the quantitative experimentation and assessment for new cyber technologies. These new methodologies will enable the exploration of modeling and simulation tools and techniques that can drive innovation in research. Additionally, these methodologies will aid in integrated experimentation by simulating the cyber environment with sufficient fidelity and integrating cyber modeling and simulation with the traditional modeling and simulation related to the kinetic domain. ***FY 2015 Accomplishments:*** This program initiated the "Metrics, Instrumentation and Emulation for Cyberspace Operations, Electronic Warfare and Communications/Networking" project executed by NRL. This project determined relevant metrics to enable the measurement of progress and improvements of tools utilized in this domain. The work developed a selected set of vignettes and scenarios of combined cyberspace operations that focused on blue/red force interactions. The vignettes offered a much more realistic evaluation of blue/red interactions and provided the DoD S&T community with a comprehensive and realistic environment for designing new cyber-EW systems. ***FY 2016 Plans:*** In FY 2016, the "Metrics, Instrumentation and Emulation for Cyberspace Operations, Electronic Warfare and Communications/ Networking" project will continue to develop the selected set of vignettes and scenarios for combined cyberspace operations that focus on blue and red force interactions. Additionally, the project will continue to instrument a primary test-bed in support of scenario generation and bolster metric assessment/refinement. ***FY 2017 Plans:*** During FY 2017, the "Metrics, Instrumentation and Emulation for Cyberspace Operations, Electronic Warfare and Communications/Networking" project will develop and fine-tune joint metrics that will be utilized in dynamic and causal workflows. Also, efforts will focus on validating real systems to ensure effective implementation.			
Title: Embedded, Mobile & Tactical Environments (EMT) ***Description:*** Increase the focus of cyber S&T on DoD cyber systems that rely on technology beyond wired networking and standard computing platforms. The objective in the area of embedded and tactical systems is to develop tools and techniques that assure the secure operation of microprocessors within our weapons platforms and systems; enable security in real-time systems; and establish security in disadvantaged, intermittent, and low-bandwidth environments. This research also seeks to expand and cultivate military-grade techniques for securing and operating with enterprise-style commodity mobile devices, such as smartphones, tablets, and their associated infrastructures. With the constant evolution of these devices and their respective	3.718	4.760	4.120

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602668D8Z / *Cyber Security Research*	**Project (Number/Name)** P003 / *Cyber Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
infrastructures it is of the utmost importance to provide a secure environment where these devices can be effectively utilized, monitored and tracked. ***FY 2015 Accomplishments:*** During this fiscal year, this program initiated a tri-service project called "Resilient and Assured UAS Systems and Operations." This AFRL-led effort developed mission and threat scenario information that enumerated threats to the avionics/platform of unmanned aircraft systems (UAS). This protects mission data and reduces the risk of asset and data loss. The results of this first year's efforts informed an Analysis of Alternatives (AoA) for the UAS/ground control mission computer to include full avionics interface/systems. Additionally, this program funded a tri-service effort to support the international effort under the Technical Cooperation Program's Cyber Strategic Challenge Group Project. The effort developed exemplar concepts and capabilities across "EM Cyber" – those capabilities that exhibit an interdependence of electromagnetic and cyber technologies and which might link Cyber with other domains including Electronic Warfare (EW), Communications and Signals Intelligence (SIGINT). ***FY 2016 Plans:*** During this fiscal year, this program initiated a tri-service project called "Resilient and Assured UAS Systems and Operations." This AFRL-led effort developed mission and threat scenario information that enumerated threats to the avionics/platform of unmanned aircraft systems (UAS). This protects mission data and reduces the risk of asset and data loss. The results of this first year's efforts informed an Analysis of Alternatives (AoA) for the UAS/ground control mission computer to include full avionics interface/systems. Additionally, this program funded a tri-service effort to support the international effort under the Technical Cooperation Program's Cyber Strategic Challenge Group Project. The effort developed exemplar concepts and capabilities across "EM Cyber" – those capabilities that exhibit an interdependence of electromagnetic and cyber technologies and which might link Cyber with other domains including Electronic Warfare (EW), Communications and Signals Intelligence (SIGINT). ***FY 2017 Plans:*** Efforts during FY 2017 will demonstrate the prototype mission computer that integrates the capabilities developed in prior years. Potential transition opportunities to Air Force Life Cycle Management Center (AFLCMC), NRL, Naval Air Systems Command (NAVAIR), and CERDEC for experimentation.			
Accomplishments/Planned Programs Subtotals	17.748	13.701	12.183

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602751D8Z / *Software Engineering Institute (SEI) Applied Research*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	8.844	8.807	8.420	-	8.420	9.343	10.120	10.260	10.462	Continuing	Continuing
P278: *Software Engineering Institute (SEI) Applied Research*	-	8.844	8.807	8.420	-	8.420	9.343	10.120	10.260	10.462	Continuing	Continuing

A. Mission Description and Budget Item Justification

Software is a key to meeting the Department of Defense's (DoD) increasing demand for high-quality, affordable, and timely national defense systems. With growing global parity in software engineering, the DoD must maintain leadership to avoid strategic surprise. To assist the DoD in retaining a long-term differential advantage over potential adversaries, the Software Engineering Institute (SEI) Applied Research program element (PE) develops and evaluates the feasibility and practicality of software and computer science concepts, with the potential to improve future DoD systems. The SEI's program of work coordinates across the DoD through Reliance 21, the overarching framework of the DoD's Science & Technology (S&T) joint planning and coordination process. This PE benefits every Community of Interest (COI) due to the ubiquitous nature of software, but directly benefits: Command, Control, Communications, Computers, and Intelligence (C4I); Autonomy; Cyber; and Engineered Resilient Systems. This PE also leverages expertise in government, industry, and academia to enable the development of joint-Service capabilities.

This PE represents a pivot toward more fundamental research that enables the DoD to address longer-term challenges in software technology and engineering. The SEI Applied Research PE funds the SEI Federally Funded Research and Development Center (FFRDC), as the leading DoD center for addressing these longer term challenges. The SEI Applied Research PE bolsters the organic research at the SEI FFRDC, enables stronger collaborations between the SEI FFRDC and academia, attracts top researchers to the SEI, gives the DoD access to top experts in information science, and generally enhances the DoD's ability to benefit from the military applications of research in software and computer science.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	9.143	8.824	8.961	-	8.961
Current President's Budget	8.844	8.807	8.420	-	8.420
Total Adjustments	-0.299	-0.017	-0.541	-	-0.541
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.296	-			
• Realignment for Higher Priority Programs	-	-	-0.476	-	-0.476
• FY15 Reprog. for Cancelled Account	-0.003	-	-	-	-
• FFRDC Reduction	-	-0.017	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602751D8Z *I Software Engineering Institute (SEI) Applied Research*

• Economic Assumptions	-	-	-0.065	-	-0.065

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602751D8Z / *Software Engineering Institute (SEI) Applied Research*	Project (Number/Name) P278 / *Software Engineering Institute (SEI) Applied Research*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P278: *Software Engineering Institute (SEI) Applied Research*	-	8.844	8.807	8.420	-	8.420	9.343	10.120	10.260	10.462	Continuing	Continuing

A. Mission Description and Budget Item Justification

Software is a key to meeting the Department of Defense's (DoD's) increasing demand for high-quality, affordable, and timely national defense systems. With growing global parity in software engineering, the DoD must maintain leadership to avoid strategic surprise. To assist the DoD in retaining a long-term differential advantage over potential adversaries, the Software Engineering Institute (SEI) Applied Research PE seeks to establish a program of applied research that will develop and evaluate the feasibility and practicality of software and computer science concepts with the potential to improve future DoD systems.

The SEI Applied Research PE has four main research thrusts: (1) modern software tools, integrated development environments, and software engineering processes for capturing large data sets about development activities and performance; (2) model-based engineering for the design, verification, and validation of software-intensive cyber-physical systems; (3) software production and code analysis techniques that improve the ability to predict how complex software systems will behave; and (4) Successful use of software-reliant systems involving a human element. These thrusts have known military applications and can be associated with active areas of basic research. The SEI Applied Research PE seeks to translate this promising basic research into solutions for broadly defined military needs. This PE will leverage the expertise of the SEI FFRDC in advanced technology development and technology transition to design, develop, and improve tools, prototypes, and new processes that meet general requirements for software-intensive DoD systems.

The SEI Applied Research PE will conduct research in multicore computing, architecture-led iterative incremental development (Agile at scale); and emerging software and computer science areas that can act as catalysts for acquiring DoD systems with improved performance.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Software Engineering Institute Applied Research	8.844	8.807	8.420
Description: Research projects at the SEI FFRDC will be awarded under this PE on a competitive basis across the SEI. Funding levels in each thrust area may vary from year to year. Research will address the goal of assisting the DoD in retaining a long-term differential advantage over potential adversaries in the area of software-intensive systems and cybersecurity by enhancing assurance, exploiting automation, and understanding human-computer interaction. The four main thrust areas are: 1) Modern software tools, integrated development environments, and software engineering processes have captured large data sets about development activities and performance. This thrust seeks to study the metrics, measurement methodologies, and data analytics required to better understand cost, schedule, security, and performance drivers of software projects based on real-world observation and experimentation for the purposes of assessing fragility and technical debt, improving resiliency and scalability, and supporting cost/performance tradeoffs.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602751D8Z / *Software Engineering Institute (SEI) Applied Research*	**Project (Number/Name)** P278 / *Software Engineering Institute (SEI) Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

2) Model-based engineering for the design, verification, and validation of software-intensive cyber-physical systems (e.g., DoD platforms, Internet of Things (IoT)). This thrust brings automated tools to the problems of requirements engineering, architectural design, and testing. The intention is to dramatically improve assurance and confidence in software-reliant systems through techniques and tools such as model checking and constraint solvers. These tools build upon evidence produced at each step of the acquisition and development lifecycles and which may be applied to running systems in support of mission assurance objectives.

3) Software production and code analysis techniques that improve the ability to predict how complex software systems will behave. Software systems today are assembled from components supplied from around the world, often with unknown provenance. Consequently, analysis techniques that indicate the past and potential behavior of code artifacts (e.g., binaries) are important to make assurance claims. This thrust aims to develop techniques to build more secure software given knowledge of risky design patterns and forensics, and to combine this with code analysis techniques (developed in concert with malware analysis) to predict the behavior of software systems comprised of components acquired through a risky or unknown supply chain.

4) Successful use of software-reliant systems involves a human element. This thrust addresses issues including insider threat behavior, user security; trust in automated systems, and cybersecurity threat intelligence. Its aim is to acquire insights into how humans interact with technology (including computers) to understand if functionality provided can be used efficiently in missions, including circumstances where users may be under stress and/or must contemplate cooperation with robotic assistants.

FY 2015 Accomplishments:

- Studied, created, and significantly improved secure coding rules for the C++ Coding Standard, a programming language used in major weapons systems such as the Joint Strike Fighter.
- Researched and developed several static analysis checkers to reduce coding mistakes and vulnerabilities in software for improved security throughout the DoD supply chain.
- Developed tools and techniques to automate the analysis of increasingly complex malware to generate effective, scalable, and rapid responses to cyber threats.
- Studied and produced tools, techniques, and system configurations to identify behavior used by malicious insiders, to prepare the Defense Industrial Base (DIB) to meet new National Industrial Security Program Operating Manual (NISPOM) insider threat regulations effective in 2016.
- Created a comprehensive simulation model for DoD system sustainment programs to conduct analysis of mission demand, technology, and funding to identify and mitigate risks for the sustainment of DoD engineering work.
- Developed and tested initial feasibility of processes to automate tools and techniques for scalable, high-fidelity assessments of individual performance during exercises for cyber mission teams.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602751D8Z / *Software Engineering Institute (SEI) Applied Research*	**Project (Number/Name)** P278 / *Software Engineering Institute (SEI) Applied Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Developed new formal verification algorithms and automated analysis tools to verify the design and performance of mission-critical cyber-physical, distributed-adaptive, real-time systems. • Produced methods, techniques, and semi-automated tools for assuring the quality and affordability of DoD avionics systems through identification of technical debt and verification of architectural alternatives. • Created a prototype tool, analysis techniques, and measures to detect and identify system defects in DoD aviation acquisition programs prior to critical design review and system integration testing. ***FY 2016 Plans:*** • Evaluate the balance of cyber vs. non-cyber investment for the Software Engineering Institute to reflect information technology gaps in the DoD's mid and long-term plans. • Ensure that the SEI uses and collects information from interactions with such groups as the service communities of interest, the RDA Task Force, the Defense Science Board, and other relevant groups to identify the gaps in the Department of Defense's software and information system strategy. • Create techniques for assisting analysts in determining anomalies and outliers in data analytics processing. • Study and develop techniques and tools for automated reduction of cyber vulnerabilities in existing software. ***FY 2017 Plans:*** • Research and create tools and techniques for automatic detection and semi-automatic mitigation of potential security vulnerabilities introduced by configuration and software development errors. • Develop principles, tools, and techniques for characterizing and performing risk assessments of, and mitigation strategies for, potential collateral damage resulting from electronic warfare and/or cyber operations. • Create new, scalable techniques, algorithms, and tools for understanding the behavior of programs in binary form, including malware and other software of unknown provenance. • Study and develop formal methods, tools, and modeling techniques to design adaptable software that accommodates failures in cyber-physical environments with highly uncertain conditions. • Develop tools and techniques for the automatic generation of intelligible explanations of autonomous/robotic behaviors that will help to establish trust with human operators in critical situations.			
Accomplishments/Planned Programs Subtotals	8.844	8.807	8.420

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• BA 3, PE# 0603781D8Z: *Software Engineering Institute (SEI)*	15.198	15.173	14.264	-	14.264	15.441	15.909	16.130	16.447	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 2	**R-1 Program Element (Number/Name)** PE 0602751D8Z / *Software Engineering Institute (SEI) Applied Research*	**Project (Number/Name)** P278 / *Software Engineering Institute (SEI) Applied Research*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost

Remarks

Together with PE 0603781D8Z, SEI, the SEI Applied Research PE represents a pivot toward more fundamental research that enables the DoD to address longer-term challenges in software technology and engineering. The SEI Applied Research PE will fund the SEI FFRDC as the leading DoD center for addressing these longer term challenges. The SEI Applied Research PE bolsters the organic research at the SEI FFRDC, enables stronger collaborations between the SEI FFRDC and academia, attracts top researchers to the SEI, gives the DoD access to top experts in information science, and generally enhances the DoD's ability to benefit from the military applications of research in software and computer science.

D. Acquisition Strategy

N/A

E. Performance Metrics

- Transition of tools, methods, and practices for use in DoD technology development programs and programs of record.
- Transition of tools, methods, and practices to the DIB to support DoD technology development programs and programs of record.
- Number of citations in peer reviewed journals and reports.
- Number of external research collaborations and interactions with the broader software and computer science community.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	52.552	24.132	25.864	23.902	-	23.902	25.650	25.835	26.192	26.706	Continuing	Continuing
P002: *Insensitive Munitions Advanced Technology*	45.441	17.826	19.178	17.756	-	17.756	19.055	19.191	19.456	19.839	Continuing	Continuing
P301: *Enabling Fuze Advanced Technology*	7.111	6.306	6.686	6.146	-	6.146	6.595	6.644	6.736	6.867	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program addresses advanced technology development associated with improving the lethality, reliability, safety, and survivability of munitions and weapon systems. The goal is to develop and demonstrate joint enabling technologies that can be used by the Program Executive Offices (PEO) as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus maximizing efficiencies, ensuring the development of technology with the broadest applicability while avoiding duplication of efforts.

Munition Area Technology Groups (MATGs) and Fuze Area Technology Groups (FATGs) have been established for each munition and capability area and are tasked with: 1) coordinating, establishing, and maintaining 2018 and 2023 year technology development plans and roadmaps, 2) coordinating biannual meetings to review technical and programmatic details of each funded and proposed effort, 3) developing and submitting Technology Transition Agreements in coordination with appropriate PEO for insertion in their Insensitive Munition (IM) Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The Joint Insensitive Munitions Technical Program (JIMTP) and Joint Fuze Technical Program (JFTP) will utilize a Technical Advisory Committee (TAC) (consisting of senior Department of Defense (DoD) and Department of Energy (DOE) laboratory representatives and senior Munitions PEO representatives) to provide program oversight, policy, direction, and priorities during its annual meeting.

The IM effort will demonstrate enabling technologies needed to develop weapons in compliance with IM requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoD Instruction 5000.1. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority munitions identified in the PEO IM Strategic Plans. Mature and demonstrated IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other non-compliant munitions within their portfolios.

The JIMTP investments focus on five Munition Areas: 1) High Performance Rocket Propulsion, 2) Minimum Signature Rocket Propulsion, 3) Blast and Fragmentation Warheads, 4) Anti-Armor Warheads, and 5) Gun Propulsion. MATGs, under tri-service leadership, have developed technology roadmaps for each Munition Area which are used to guide investments based on goals consistent with the PEO IM Strategic Plans. These IM technologies, alone or in combination, will be incorporated in hardware, simulating real-world munitions, to demonstrate their utility and feasibility as part of Technology Transition Agreements with PEOs.

The Enabling Fuze Advanced Technology effort will also demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development (GDF) of the Force, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm

to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration weapons and programs based on priority capabilities and technology needs identified and validated by the PEOs and the Heads of the Service Science and Technology (S&T) communities. In this way, promising multi-point initiation architectures, high reliability fuze architectures, survivable components, modular fuze packaging, and components produced based on ease of manufacturing can be integrated into munitions applications and its ability to address required capability needs will be validated. Mature fuze technologies will be transitioned to Weapon PEO's and/or Industry, thereby decreasing program costs and schedule risk while facilitating technology into potentially broader range of munitions applications.

The JFTP investments focus on four specific capability areas that have been identified by the Department's strategic guidance and current shortfalls in weapon systems and as validated by the PEOs and the Service S&T communities. The capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture. The Fuzing technologies will be incorporated in weapon applications to demonstrate their maturity and utility as part of Technology Transition Agreements with PEOs.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	26.650	25.915	25.941	-	25.941
Current President's Budget	24.132	25.864	23.902	-	23.902
Total Adjustments	-2.518	-0.051	-2.039	-	-2.039
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.476	-			
• Realignment for Higher Priority Programs	-	-	-1.854	-	-1.854
• FY15 Reprog. for Cancelled Account	-0.010	-	-	-	-
• Other Reprogrammings	-2.032	-	-	-	-
• FFRDC Reduction	-	-0.051	-	-	-
• Economic Assumptions	-	-	-0.185	-	-0.185

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / *Joint Munitions Advanced Technology*	Project (Number/Name) P002 / *Insensitive Munitions Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P002: *Insensitive Munitions Advanced Technology*	45.441	17.826	19.178	17.756	-	17.756	19.055	19.191	19.456	19.839	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Insensitive Munitions (IM) effort addresses advanced technology development associated with improving the lethality, reliability, safety, and survivability of munitions and weapon systems. The goal is to develop and demonstrate joint enabling technologies that can be used by program managers as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus ensuring the development of technology with the broadest applicability while avoiding duplication of efforts – providing efficiencies and cost savings for the Department.

This effort will demonstrate enabling technologies needed to develop weapons in compliance with IM requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoD Instruction 5000.1 and 5000.02. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority munitions identified in the Program Executive Office (PEO) IM Strategic Plans. Mature demonstrated IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other non-compliant munitions within their portfolios.

The Joint Insensitive Munitions Technology Program (JIMTP) investments focus on five Munition Areas: 1) High Performance Rocket Propulsion, 2) Minimum Signature Rocket Propulsion, 3) Blast and Fragmentation Warheads, 4) Anti-Armor Warheads, and 5) Gun Propulsion. Munition Area Technology Groups (MATG), under tri-service leadership, have developed technology roadmaps for each Munition Area which is used to guide investments based on goals consistent with the DoD IM Strategic Plan. These IM technologies, alone or in combination, will be incorporated in hardware, simulating real-world munitions, to demonstrate their utility and feasibility as part of Technology Transition Agreements with PEOs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: High Performance Rocket Propulsion (HPP)	3.694	3.957	3.684
Description: HPP focus on the development and demonstration of technologies to improve the IM response of HPP systems, rocket motors with Ammonium Perchlorate and with or without a metal fuel, for rockets and missiles launched from air, ground, and sea platforms. These technologies, when applied to rocket motors, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, rocket propellant ingredients, including synthesis, characterization and scale-up; reduced smoke or smoky propellants, including formulation, characterization and scale-up; rocket motor case design; materials for active and passive thermal mitigation; shock mitigation materials and techniques; passive and active coatings; active and passive venting techniques for motor cases or containers; ignition systems; sensors; and thrust mitigation techniques. Operating conditions may be controlled or widely varying in both temperature and vibration. The 2018 and 2023 year goals of the HPP MATG are concentrated on			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
solving the IM response of missile propulsions systems due to Fragment Impacts and Slow Cook Off for the majority of High Performance Propulsion rocket motors, and solving the Fast Cook Off response of very large High Performance Propulsion motors. ***FY 2015 Accomplishments:*** - Conducted sub-scale bullet and fragment impact demonstration tests and performance evaluation of 50 to 70 pound motors containing an extinguishable rocket propellant. - Completed design and component testing of slow cook-off mitigation device components for HPP rocket motor. - Performed component-level testing to validate component designs for sensor for surface and air-launched systems. - Demonstrated slow cook-off mitigation sensor performance and validate design for surface launched missile applications. ***FY 2016 Plans:*** - Conduct slow and fast cook-off demonstration tests of 50 to 70 pound motors containing an extinguishable rocket propellant. - Demonstrate fast cook-off sensor mitigation performance and transition to programs of record. - Conduct tests of slow cook-off mitigation device components for HPP rocket motor. - Conduct full scale test of slow cook-off mitigation sensor and IM tests with integrated sensor in various motor configurations. - Produce prototype hardware and prepare to integrate several IM technologies into a rocket motor. - Conduct proof of concept testing on three IM mitigation techniques for HPP motors. Scale up formulation to 5 gallon mixes for initial testing. ***FY 2017 Plans:*** - Conduct full scale testing to ensure that mitigation design and integration is technically sound. - Scale up HPP motor propellant to 50 gallon batches to conduct full scale motor IM testing. Verify the rocket motor meets the specified ballistic and IM performance requirements. - Demonstrate an integrated solution for a 7” rocket motor using plateau burning propellant as well as cased venting solutions for SCO mitigation.			
Title: Minimum Signature Rocket Propulsion (MSP)	2.028	2.332	2.055
Description: MSP focuses on the development and demonstration of technologies to improve the IM response of MSP systems. The development and demonstration of minimum signature (MS) rocket technologies, when applied to munition systems, will improve munition IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, MS rocket propellant formulations; ingredients for MS propellant formulations, including synthesis, characterization and scale-up; case and packaging design; active and passive venting techniques; rocket motor case design; ignition systems; and thrust mitigation techniques. Of particular interest are technologies toward higher burning rate MS propellants with state-of-the-art energy and reduced shock sensitivity. The 2018 and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
2023 year goals of the MSP MATG are concentrated on solving the IM response of missile propulsion systems due to Fragment Impact, Slow Cook Off, and Shaped Charge Jet (SCJ) threats. ***FY 2015 Accomplishments:*** - Manufactured pathfinder composite rocket motor cases and cast motors with new propellant formulations. - Tested performance and environmental aspects of prototype IM air to ground rocket motors. - Conducted analog fragment impact tests on propellant low-cost anti-artillery rounds using composite cases. Designed and manufactured full size motor cases and propellant extrusion tooling. ***FY 2016 Plans:*** - Manufacture motor cases and complete propellant formulation down-select. Conduct case characterization testing, load motors and conduct static firing of motors with mitigation devices. - Complete detailed motor design and manufacture motors. Conduct static motor tests, and fragment impact and slow cook-off tests on representative composite motor cases. - Define shipping container requirements and design, manufacture, and demonstrate ballistic protection panel in representative container for air launched rocket motor. Conduct characterization tests for new IM rocket motor propellant. - Design rocket motor case for hand held rocket motor incorporating IM features. ***FY 2017 Plans:*** - Conduct IM tests on full scale rocket motors with down-selected propellant formulation and mitigation devices. - Conduct full scale fragment impact and slow cook-off tests on composite case motors for low-cost anti-artillery rounds. - Demonstrate a new, less sensitive rocket motor for the shoulder launched SMAW system - Use modeling to predict response of motor to IM threat, conduct preliminary testing with new container, and with baseline and new propellant. - Fabricate shoulder launched rocket motor cases from down selected designs, conduct safety testing, and assemble motors for testing.			
Title: Blast and Fragmentation Warheads (BFW) ***Description:*** BFW focus on the development and demonstration of technologies to improve the IM response of BFW munitions. The development and demonstration of explosive ingredients, explosives, and warhead and fuze technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection / packaging materials and systems, shock mitigation liners, initiation devices, techniques, and technologies. Applications vary but include high performance warhead fills, booster explosives, bulk demolition charges, and bulk fills for blast	7.192	7.386	7.063

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and/or fragmentation charges. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, and reliability may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the BFW MATG are concentrated on solving the IM response of blast fragment warheads to the Sympathetic Detonation, Fast Cook Off, and Shaped Charge Jet (SCJ) threats. ***FY 2015 Accomplishments:*** - Produced 660 kilogram of innovative explosive fill for general purpose bombs to complete full-scale sympathetic reaction testing to validate performance. - Modeled and designed feasible detonation train, scaled up novel bomb formulation to 150 gallon mix quantity, filled full-scale assets for sympathetic reaction testing to validate performance. - Conducted bullet impact, fragment impact, and slow cook-off testing with production representative grenade assembly using novel explosive material. - Scaled up and conducted small scale tests on novel bomb fill to optimize formulation and select final formulation. Conducted performance testing of fill and initiation study. - Scaled up to produce 1000 pounds of unique munition fill material to conduct performance and sensitivity testing in generic warhead assemblies. Prepared for full scale IM testing. ***FY 2016 Plans:*** - Scale up novel bomb formulation to 150 gallon mix quantity, and fill full-scale assets for sympathetic reaction testing to validate performance. - Conduct SCJ and fragment impact testing on unique munition fill material in representative hardware. - Validate cook-off mitigation technologies in components, manufacture proven components, integrate components in final warhead for environmental and performance testing. - Conduct studies on vent areas, design and fabricate hardware, conduct component testing on warhead. - Conduct pressing evaluation study, load, and begin IM testing of main fill replacement explosive formulation. - Design and conduct small scale tests to support modeling of unique venting mechanism for large scale warheads. ***FY 2017 Plans:*** - Produce engineering drawings for final component designs that have been evaluated and optimized for the warhead for full scale slow cook-off testing. - Conduct lethality and effectiveness testing on main fill replacement explosive in preparation for IM tests in the pre formed fragment Artillery round. - Integrate and conduct cook off testing on the CAT torpedo that could improve the SCO response of the Mk54 as well.			
Title: Anti-Armor Warheads (AAW)	3.312	3.586	3.301

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Description: AAW focuses on the development and demonstration of explosive ingredients, explosives, and warhead and fuze technologies for improving Insensitive Munitions (IM) of AAW munitions. The development of explosive ingredients, explosives, and warhead and fuze technologies, when applied to munitions, improve IM response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, new ingredient synthesis and characterization, initial formulation development, scale-up, warhead/charge configuration, venting techniques for both munitions and their containers, protection/packaging materials and systems, shock mitigation liners, and initiation devices, techniques, and technologies. Applications vary, but include high performance warhead fills, booster explosives, and all other technology to mitigate the violent response of AAW munitions to IM threats. Munition operating conditions may be controlled or have widely varying environmental conditions, such as temperature and vibration, and other factors such as cost, availability, and reliability may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the AAW MATG are concentrated on solving the IM response of anti-armor warheads to the Fragment Impact, Sympathetic Reaction, and Shaped Charge Jet threats for larger munitions and the Fragment Impact, Slow Cook-off, and Sympathetic Reaction / Shaped Charge Jet threats for Medium Caliber Munitions.

FY 2015 Accomplishments:
- Conducted performance and IM testing on higher velocity munition ID design.
- Conducted ballistic assessment and IM testing for two unique energetic materials as a replacement munition booster.
- Conducted integration and design efforts with prototype AAW technologies to demonstrate successful IM technologies to mitigate fragment impact responses.
- Conducted baseline assessment of unique munition system.

FY 2016 Plans:
- Perform modeling and simulation of venting and other mitigation technologies for unique munition system. Conduct propellant formulation, development, and down-select, and begin IM testing.
- Use live fire testing and modeling to establish baseline performance data for a multi-munition warhead. Modeling and simulation will be used to predict the likelihood of sympathetic detonation beginning with individual warheads, then combining them in representative configurations.
- Conduct baseline warhead fast and slow cook-off testing and venting characterization studies on small warhead.

FY 2017 Plans:
- Improve the sensitivity of the XM-25 medium caliber warhead that can transition to other 30mm and 40mm rounds.
- Optimize unique shield design and conduct validation testing; optimize venting feature designs and test; and conduct cook-off testing which validates component level CO mitigation technologies.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Improve the shock response of the 120mm direct fire tank round with the integration of PIMS liners, melt out fuzes and novel explosives materials.			
Title: Gun Propulsion (GP) ***Description:*** GP focuses on the development and demonstration of technologies in the area of GP systems. The development and demonstration of gun propulsion technologies, when applied to munition systems, will improve munition Insensitive Munitions (IM) response to one or more threats, while not degrading the response to other IM threats and, at minimum, maintaining munition performance. Technologies include, but are not limited to, gun propellant formulations, ingredients for gun propellant formulations (including synthesis, characterization and scale-up), cartridge case and packaging design, active and passive venting techniques, reduced sensitivity primer propellant and primer systems, and robust primers for insensitive propellants. Applications vary, but include both large and medium caliber munitions, as well as propelling charges for mortars and shoulder launched munitions. Operating requirements vary, and other factors such as barrel life and operation over varying environmental conditions may be critically important depending on the intended munition application. The 2018 and 2023 year goals of the GP MATG are concentrated on solving the IM response of gun propulsion munitions to Fragment Impact and Slow Cook Off threats. ***FY 2015 Accomplishments:*** - Conducted thermal and venting analysis, full-scale fast and slow cook-off, and fragment impact testing of two propellant formulations for use in shoulder fired weapon systems. - Produced prototype of large caliber ammunition item with venting and prepare for full scale IM testing. - Conducted component design and manufacturing of large caliber munition item, and conduct performance testing. Integrated propellant formulation and component design to conduct small scale fragment impact testing and slow cook-off test. ***FY 2016 Plans:*** - Conduct performance, environmental, and IM testing on propulsion system for use in shoulder fired weapon systems. - Conduct static pressure, environmental, and small scale fragment impact testing of new large caliber munition item. ***FY 2017 Plans:*** - Integrate propulsion and warhead IM solutions into single system for IM testing for use in shoulder fired weapon systems for new enclosure fire capability. - Conduct full scale IM testing on the 120mm rifled mortar cartridge to improve the cook off response and impact threats into the propelling charge.	1.600	1.917	1.653
Accomplishments/Planned Programs Subtotals	17.826	19.178	17.756

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P002 / *Insensitive Munitions Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0602000D8Z P000: *BA2 Insensitive Munitions*	13.310	13.082	11.993	-	11.993	13.035	13.183	13.362	13.625	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transition of technologies developed by the program are tracked and documented by technology maturity.
2) MATG Technology Roadmaps are prepared, evaluated, and analyzed by JIMTP management and technical staff.
3) Chairman's Annual Assessments for each MATG are critically reviewed by the TAC to determine progress, transition plans, and relevance of each project.
4) Project progress toward goals and milestones is assessed at each MATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) External Peer Reviews of Projects are conducted as part of Joint Army/Navy/NASA/Air Force meetings.
7) Technology Transition Agreements are in place with Munition programs.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / *Joint Munitions Advanced Technology*	Project (Number/Name) P301 / *Enabling Fuze Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P301: *Enabling Fuze Advanced Technology*	7.111	6.306	6.686	6.146	-	6.146	6.595	6.644	6.736	6.867	Continuing	Continuing

A. Mission Description and Budget Item Justification

This effort will demonstrate fuze enabling technologies needed to develop weapons that address priority capability areas identified in the Guidance for Development of the Force, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies integrated and tested to technology maturity and demonstrate the technologies to technological maturity utilizing weapon hardware based on priority capabilities and technology needs identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service Science and Technology (S&T) communities. Mature demonstrated fuze technology will be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other munitions within their portfolios. Under the Joint Fuze Technology Program (JFTP), investments are focused on specific capability areas that have been identified by Department strategic guidance and current shortfalls in weapon systems and validated by the PEOs and Heads of the Service S&T communities. These four capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects (TE) Weapon Fuzing, 3) High Reliability Fuzing, and 4) Enabling Fuze Technologies and Common Architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Hard Target Fuzing	1.702	1.561	1.311
Description: The Hard Target Fuzing challenges are grouped into three Technology Areas. First, improved modeling and simulation capabilities provide the validated computational tools necessary for hard target applications. Second, basic phenomenology & understanding of the Fuze Environment is the science-based endeavor of providing the test equipment, instrumentation, and analysis techniques for experimentation and data gathering necessary for next generation fuzing. Third, hard target survivable fuze components are developed to increase the effectiveness of facility denial munitions by improving the prediction tools and testing methodologies to evaluate the survivability and functionality of legacy and future fuzes. Development of these technologies will enable next generation boosted and hypersonic penetrators to execute missions against hardened and deeply buried targets.			
FY 2015 Accomplishments: - Conducted high speed weapon hard target tests, including high shock data recorders, for validating High-G fuze models in advanced DoD and DOE computational codes.			
FY 2016 Plans: - Continue development of advanced fuze packaging and alternate low-cost media detection sensor for to measure post impact weapon environments.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P301 / *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Complete assessment of advanced DoD and DOE computational codes to accurately predict the response of the fuze that will increase the fidelity of modeling and simulating fuze survivability and function in extreme high G weapon penetrating environments.			
Title: Tailorable Effects Fuzing ***Description:*** Develop fuzing for tailorable effects weapons that encompasses the ability to selectively vary the output of the weapon (Dial-a-Yield) and/or the ability to generate selectable effects (directed blast, fragmentation). Develop initiation and multi-point technologies; electronic safe and arm based multi-point initiators for tunable output – scalable yield warheads; MicroElectro-Mechanical Systems (MEMS) based multi-point initiators for tunable output/scalable yield warheads; and smart fuzing for tailorable effects weapons. These technologies will enable weapons that can effectively defeat a variety of targets while minimizing unintentional collateral effects. ***FY 2015 Accomplishments:*** - Conducted demonstration tests of modeling toolset capable of modeling complex targeting scenes for end-game proximity fuze sensors in tailoring warhead effects. Algorithm toolset technologies will be transitioned to industry partner via a Cooperative Research and Development Agreement (CRADA) or funded contract to enable modeling of future proximity fuze systems. - Develop and demonstrated component technologies for multi-mode, multipoint sequential timing fuze designs that will improve void counting algorithms and optimize detonation timing. ***FY 2016 Plans:*** - Conduct weapon demonstration testing of multi-mode, multipoint sequential timing fuze designs against representative target sets. ***FY 2017 Plans:*** - Complete industry collaborative development of integrated switch and trigger technologies into commercial available Exploding Foil Initiators (EFI), in a variety of package sizes for use in DoD Electronic Safe Arm Devices (ESAD). - Tailorable Command/ Arm System for Distributed Fuzing Systems technology targeted for application in Non-Disruptive Umbilical Solutions for DPICM Replacement (USMC); Joint Multi-Effects Warhead System (Navy); Long-Range Precision Fires Program (Army).	1.452	1.644	1.572
Title: High Reliability Fuzing ***Description:*** Develop high reliability fuzing architectures, fuzing components, and unexploded ordnance (UXO) reduction features. This program's fuzing technologies are critical to enable the next generation of cluster munitions to achieve the required greater than 99 percent reliability. Evolving DoD emphasis on increased weapon system reliability is driving the need to consider new and novel approaches for achieving increased fuze reliability while maintaining or enhancing fuze design safety. DoD policy,	1.721	1.820	1.702

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P301 / *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
higher weapon reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies. ***FY 2015 Accomplishments:*** - Tested high reliability MEMS fuze technology prototypes by expose the MEMS prototypes to environments that represent a fuze life cycle, assess any failures and determine cause, and utilize statistical methods to determine the device reliability. - Continued to develop fuze system communication and interface technologies for Dual-Purpose Improved Conventional Munitions (DPICM) to increase reliability with minimal disruption to the dispense event. ***FY 2016 Plans:*** - Apply physics based Hugh James Initiation Criteria reliability map to evaluate the performance of Navy and Army MEMS detonators though characterizing shock initiation and material properties of booster material. - Develop MEMS sure-latching micro-connectors and actuators that function reliably in 100,000-G adverse environments IRAP 40mm grenade and CMR sub-munition fuzes. ***FY 2017 Plans:*** - Conduct laboratory and projectile dispense testing of fuze communication and interface technologies High Reliability DPICM to increase reliability with minimal disruption to the dispense event. - Develop high reliability fuzing architecture and enabling component technologies for DPICM replacement cluster weapons.			
Title: Enabling Fuze Technologies ***Description:*** Develop common / modular fuze architectures; innovative fuze component technologies; sensors; next generation fuze setting capability, tools, and modeling; and fuzing power sources. These fuzing technologies will provide smaller, more cost effective solutions while meeting or exceeding the performance of existing technologies. Development of these technologies will enable future weapon applications to be more mission adaptive and smaller along with improve target detection capabilities. ***FY 2015 Accomplishments:*** - Transitioned JFTP MEMS free-fall fuze sensor technologies via partnering with Industry for bomb fuzing applications. - Conducted laboratory testing of advanced, exploitation resistant proximity sensor advanced technology development. Applied proximity sensor technology to Army large caliber projectile weapons. ***FY 2016 Plans:*** - Complete projectile testing of advanced, exploitation resistant proximity sensors against representative target sets.	1.431	1.661	1.561

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603000D8Z / *Joint Munitions Advanced Technology*	**Project (Number/Name)** P301 / *Enabling Fuze Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Begin development of free-fall bomb retard and impact sensors with decreased sensor failure/rejection rate from 30% for legacy g-sensors to <5% for MEMS sensors. ***FY 2017 Plans:*** - Develop miniaturized, low power, target detection devices to support increased precision and burst-point accuracy in Area Attack Weapons including future submunitions and enhanced unitary warhead weapons. - Develop miniaturized, low power, target detection devices for increased target discrimination & precision, target clutter rejection capability and selectable height-of-burst. Application is for area-effect and cluster weapons.			
Accomplishments/Planned Programs Subtotals	6.306	6.686	6.146

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0602000D8Z P204: *BA2 Enabling Fuze Technology*	6.181	6.270	5.752	-	5.752	6.248	6.319	6.405	6.531	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1) Transition of technologies developed by the Program are tracked and documented by technology maturity.
2) Fuze Area Technology Groups (FATG) Technology Roadmaps are prepared, evaluated, and analyzed by Joint Fuze Technology Program (JFTP) management and technical staff.
3) Chairman's Annual Assessments for each FATG are critically reviewed by the Technical Advisory Committee (TAC) to determine progress, transition plans, and relevance of each project.
4) Project progress toward goals and milestones is assessed at each FATG meeting.
5) Annual technical reports and papers are tracked and documented for the Program.
6) Technology Transition Agreements are in place with Munition programs.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense											Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603121D8Z / *SO/LIC Advanced Development*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	85.046	8.587	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
206: *Explosive Ordnance Disposal/Low-Intensity Conflict*	14.975	1.500	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
207: *Special Reconnaisance Capabilities*	38.329	3.948	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
208: *Information Dissemination Concepts*	6.326	0.637	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
209: *Irregular Warfare Support (IWS)*	25.416	2.502	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC Program develops and delivers advanced capabilities for military Explosive Ordnance Disposal (EOD) operators and Special Operations Forces (SOF) to meet the challenges of improvised explosive devices (IEDs), force protection, and the war on terrorism. EOD/LIC efforts focus in two areas: support to SOF to combat terrorism; and access, detection, identification, and neutralization of all types of conventional explosive ordnance and improvised explosive devices. Requirements submitted by the Joint Service EOD and Service Special Operations communities are prioritized and approved by OASD (SO/LIC). With a decreased budget, CTTSO will proceed with The Improvised Device Defeat (IDD)subgroup expanding its inclusion of joint service EOD operators in its efforts since the Department's announcement to cancel PE 0603121D8Z. IDD will absorb the appropriate joint service EOD requirements for prioritization and interagency coordination going forward. IDD will use the limited resources it possesses to provide the broadest possible capability improvement to the community.

P207, Special Reconnaissance Capabilities (SRC). The SRC Program exploits, leverages, and integrates DoD's service and agency efforts to improve surveillance and reconnaissance tools (unattended sensors, tagging and tracking devices, data infiltration/exfiltration, remote delivery, and mobility/delivery of sensors), while providing risk reduction for DoD and other agency technology and development programs. The SRC Program identifies, integrates, and operationalizes the technical tools for the collection of actionable information against a variety of targets and mission requirements, including emerging requirements, and maintains DoD's on-line catalog of tools in order to minimize crisis response time for special reconnaissance and surveillance.

P208, Information Dissemination Concepts (IDC). The IDC Program addresses technology capabilities necessary to enable sustained information dissemination campaigns in denied areas. The IDC program, working as necessary with DoD and the interagency, develops, modifies, and demonstrates concepts, mechanisms, platforms and payloads to propagate themes and messages that convince target audiences to take action favorable to the United States and its allies. The Surveillance, Collection, and Operations Support (SCOS) subgroup has managed the IDC project for CTTSO since gaining oversight of the funding. The language program orchestrated by SCOS will remain, albeit with a drastic reduction in funding without PE 0603121D8Z.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603121D8Z *I SO/LIC Advanced Development*

P209, Irregular Warfare Support (IWS). The IWS Program (IWSP) develops adaptive and agile capabilities and methodologies to support irregular warfare in the current and evolving strategic environments. IWSP supports joint, interagency, and other partners who conduct or counter irregular warfare through indirect and asymmetric approaches, though they may employ a full range of military and other capabilities, in order to erode an adversary's power, influence, and will. Solutions include material and non-material operational analysis, concept development, field experimentation, and delivery of capabilities, to defeat the motivations, sanctuaries, and enterprises of targeted state and non-state actors. As evidenced by every applicable Defense and National Security strategy document, (e.g., 2012 Defense Strategic Guidance (DSG), "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense, Irregular Warfare capabilities are vital to U.S. security. CTTSO, in coordination with the ASD (SO/LIC), is in the process of reviewing options to continue the IWS capability that is critical to the combating terrorism community.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	8.587	0.000	0.000	-	0.000
Current President's Budget	8.587	0.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / *SO/LIC Advanced Development*	Project (Number/Name) 206 / *Explosive Ordnance Disposal/Low-Intensity Conflict*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
206: *Explosive Ordnance Disposal/Low-Intensity Conflict*	14.975	1.500	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC Program develops and delivers advanced capabilities for military Explosive Ordnance Disposal (EOD) operators and Special Operations Forces (SOF) to meet the challenges of improvised explosive devices (IEDs), force protection, and the war on terrorism. EOD/LIC efforts focus in two areas: support to SOF to combat terrorism; and access, detection, identification, and neutralization of all types of conventional explosive ordnance and improvised explosive devices. Requirements submitted by the Joint Service EOD and Service Special Operations communities are prioritized and approved by OASD (SO/LIC). With a decreased budget, CTTSO will proceed with The Improvised Device Defeat (IDD)subgroup expanding its inclusion of joint service EOD operators in its efforts since the Department's announcement to cancel PE 0603121D8Z. IDD will absorb the appropriate joint service EOD requirements for prioritization and interagency coordination going forward. IDD will use the limited resources it possesses to provide the broadest possible capability improvement to the community.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC)	1.500	0.000	-
Description: P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC program develops and delivers advanced capabilities for military EOD operators and Special Operations Forces (SOF) to meet the challenges of improvised explosive devices (IEDs), force protection, and the war on terrorism. EOD/LIC efforts focus in two areas: support to SOF to combat terrorism; and access, detection, identification, and neutralization of all types of conventional explosive ordnance and improvised explosive devices. Requirements submitted by the Joint Service EOD and Service Special Operations communities are prioritized and approved by Office of the Assistant Secretary of Defense (OASD) (SO/LIC). ***FY 2015 Accomplishments:*** Efforts focused on tools and equipment to enhance situational awareness and operational capability during incident response, render safe or direct action operations. Continue development of a compact, high-power next generation x-ray generator for EOD use. Complete development of techniques and concept render safe tool(s) capable of achieving high order or low order disposal of insensitive high explosive (IHE) munitions. Complete development of a suite of tools for Render Safe Procedures against underwater explosive devices. Demonstrate and evaluate a multi-purpose advanced tactical timer. Develop a hydraulically-actuated, platform-independent arm system for Robotic Platforms. ***FY 2016 Plans:*** Remaining EOD/LIC projects are transitioned to Improvised Device Defeat/Explosives Countermeasures (IDD/EC).			
Accomplishments/Planned Programs Subtotals	1.500	0.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603121D8Z / *SO/LIC Advanced Development*	**Project (Number/Name)** 206 / *Explosive Ordnance Disposal/Low-Intensity Conflict*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / *SO/LIC Advanced Development*	Project (Number/Name) 207 / *Special Reconnaisance Capabilities*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
207: *Special Reconnaisance Capabilities*	38.329	3.948	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

P207, Special Reconnaissance Capabilities (SRC). The SRC Program exploits, leverages, and integrates DoD's service and agency efforts to improve surveillance and reconnaissance tools (unattended sensors, tagging and tracking devices, data infiltration/exfiltration, remote delivery, and mobility/delivery of sensors), while providing risk reduction for DoD and other agency technology and development programs. The SRC Program identifies, integrates, and operationalizes the technical tools for the collection of actionable information against a variety of targets and mission requirements, including emerging requirements, and maintains DoD's on-line catalog of tools in order to minimize crisis response time for special reconnaissance and surveillance.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: SPECIAL RECONNAISANCE CAPABILITIES (SRC).	3.948	-	-
Description: P207, Special Reconnaissance Capabilities (SRC). The primary objective of the SRC program is to seek out and identify technical tools for the collection of actionable data and information which will assist DoD in its execution of Overseas Contingency Operations (OCO) tasks. To accomplish this objective, the program leverages emerging and existing developmental technologies from government and commercial ventures and operationalizes them to meet near term reconnaissance and surveillance operational requirements. The operational tools transition unattended sensors, tagging devices, data transfer, remote delivery, and mobility/delivery of sensors into established Programs of Record throughout the DoD. The program evaluates new and existing technical surveillance technologies and incorporates results into a reference database for future access. ***FY 2015 Accomplishments:*** Continued to identify, develop, integrate, and field promising persistent intelligence, surveillance, and reconnaissance (ISR) advanced technologies and capabilities. High payoff technologies that will be researched and transitioned include: optical data transmission technologies; ultra high speed data processing and transmission; device miniaturization; low profile enhanced micro-optics; next-generation precision Hostile Forces Tagging, Tracking, and Locating capabilities; clandestine communications architectures; advanced biometric data collection; and low power, high bandwidth data transmission subsystems.			
Accomplishments/Planned Programs Subtotals	3.948	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603121D8Z / *SO/LIC Advanced Development*	**Project (Number/Name)** 207 / *Special Reconnaisance Capabilities*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / *SO/LIC Advanced Development*	Project (Number/Name) 208 / *Information Dissemination Concepts*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
208: *Information Dissemination Concepts*	6.326	0.637	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

P208, Information Dissemination Concepts (IDC). The IDC Program addresses technology capabilities necessary to enable sustained information dissemination campaigns in denied areas. The IDC program, working as necessary with DoD and the interagency, develops, modifies, and demonstrates concepts, mechanisms, platforms and payloads to propagate themes and messages that convince target audiences to take action favorable to the United States and its allies. The Surveillance, Collection, and Operations Support (SCOS) subgroup has managed the IDC project for CTTSO since gaining oversight of the funding. The language program orchestrated by SCOS will remain, albeit with a drastic reduction in funding without PE 0603121D8Z.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: INFORMATION DISSEMINATION CONCEPTS	0.637	-	-
Description: Respond to emerging needs for advanced language solutions in the operational environment including data exploitation and analysis of information in languages other than English and technology to enhance language proficiency and cultural skills. ***FY 2015 Accomplishments:*** Developed tools that assist the military in foreign language training courses. Improve foreign language applications, practices, and tools that are deployed in theater. Expedite methods of collecting and analyzing media sources and evidence more efficiently and timely. Enhance triage capabilities to store, organize, and query multimedia acquired from various sources. Deploy automated technologies capable of ingesting and translating video and audio sources for analysts to effectively report intelligence findings.			
Accomplishments/Planned Programs Subtotals	0.637	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603121D8Z / *SO/LIC Advanced Development*	**Project (Number/Name)** 208 / *Information Dissemination Concepts*

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / *SO/LIC Advanced Development*	Project (Number/Name) 209 / *Irregular Warfare Support (IWS)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
209: *Irregular Warfare Support (IWS)*	25.416	2.502	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

P209, Irregular Warfare Support (IWS). The IWS Program (IWSP) develops adaptive and agile capabilities and methodologies to support irregular warfare in the current and evolving strategic environments. IWSP supports joint, interagency, and other partners who conduct or counter irregular warfare through indirect and asymmetric approaches, though they may employ a full range of military and other capabilities, in order to erode an adversary's power, influence, and will. Solutions include material and non-material operational analysis, concept development, field experimentation, and delivery of capabilities, to defeat the motivations, sanctuaries, and enterprises of targeted state and non-state actors. As evidenced by every applicable Defense and National Security strategy document, (e.g., 2012 Defense Strategic Guidance (DSG), "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense, Irregular Warfare capabilities are vital to U.S. security. CTTSO, in coordination with the ASD (SO/LIC), is in the process of reviewing options to continue the IWS capability that is critical to the combating terrorism community.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: IRREGULAR WARFARE SUPPORT (IWS)	2.502	-	-
Description: P209, Irregular Warfare Support (IWS). The IWS Program (IWSP) develops adaptive and agile capabilities and methodologies to support irregular warfare in the current and evolving strategic environments. IWSP supports joint, interagency, and other partners who conduct or counter irregular warfare through indirect and asymmetric approaches, though they may employ a full range of military and other capabilities, in order to erode an adversary's power, influence, and will. Solutions include material and non-material operational analysis, concept development, field experimentation, and delivery of capabilities, to defeat the motivations, sanctuaries, and enterprises of targeted state and non-state actors.			
FY 2015 Accomplishments: Continued research and development of material and non-material solutions, promising capabilities, and continuation of project development, delivery, and transition to support the Department of Defense and Interagency Irregular Warfare mission. Complete the deployment of an enhanced training capability and transition to a program of record a counter- "green on blue" capability for ISAF and U.S. forces. This effort assists warfighters in detecting and mitigating insider threat attacks in partner, COIN and contingency operations, which is a serious issue that undercuts efforts at training host nation security forces, one of the pillars of Irregular Warfare. Continue to support Project LEGACY, a capability that significantly improves host-nation police counterinsurgency and military intelligence capabilities. Mentoring via the Legacy program will continue through FY14, though substantial drawdowns will begin starting in October 2013 with additional reductions occurring throughout 2014. Complete the effort that elicited and refined requirements from users within a rapid assessment framework in order to successfully pair SOF and Interagency users with off the shelf, high performance technologies and novel capabilities that fulfill specific requirements to share and analyze operational data better and faster. Continue to research and develop threat group and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603121D8Z / *SO/LIC Advanced Development*	**Project (Number/Name)** 209 / *Irregular Warfare Support (IWS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
geographic assessments based on open source information that allows operators and decision makers to understand the threats associated within their various areas of operation globally and how these threat groups affect the global security of the US and its allies. Continued to develop and expand an effort that integrates and fuses heterogeneous social medial data for use in strategic and tactical operational planning and preparation of the battlefield with new end users and different support environments. This effort will continue to provide a real time data and analysis capability along with mentorship and the analytical tradecraft to understand and monitor critical events and sentiments in open source social media. Continue to develop and refine frameworks and training to better understand and implement Combatant Command (COCOM) -level Communication Activities to include training designed to equip decision makers and operators with the knowledge and skills necessary to properly utilize population data and avoid common traps and risks in order to assess and appropriately interpret the population research required in support of these Communications Activities. Developed enhanced MISO/PSYOP capabilities in planning, targeting and execution for support to special and unconventional warfare mission requirements. Deliver enhanced mobile capability for assessing and surveying assault and landing zones to support small units conducting distributed operations in remote and austere environments (to include resupply/drop zones, refueling, and helicopter landing zones). Deliver research, operational analysis, and field experimentation of multiple efforts intended to counter emerging and extant threats in the intersection of the digital-physical domains (e.g. understanding the usage of social media by transnational criminal organizations in order to predict changes in support and influence; measuring the of effectiveness of social media and understanding how to use this media for intended effects). Continue to develop and deliver Secure Unclassified Network (SUNet) which provides a unique virtualization of a single hardware suite of servers and software that will provide protected dynamic enclaves of capability for multi-agency users (Law Enforcement, Interagency, Coalition, and Foreign Nationals). This effort enables an inter-organizational collaborative area and enhanced capabilities of data upload, searching and sharing from headquarters down to smartphones, tablets or laptops. Research, develop, test and evaluate material and non-material solutions that build and/or enhance Military Information Support Operations (MISO) forces' capabilities that are essential to unconventional warfare missions. Research, develop, test, evaluate and field capabilities that enhance Special Warfare operations and building the capacity of our partner nation forces. Spiral development of a non-material effort intended to better understand indirect and irregular threats currently facing the US, and how to implement effective measures against them. This effort will support of the Army Special Operations Command and will include wargaming and experimentation, strategy assessment and recommendations for future operations planning. Initiate research and development effort to understand "Lawfare" or the strategy of "using – or misusing – law as a substitute for traditional military means to achieve an operational objective." This effort will review current literature and case studies of lawfare, conduct gap analysis and develop recommendations for use in the Lawfare realm by the US and its allies.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603121D8Z / *SO/LIC Advanced Development*	**Project (Number/Name)** 209 / *Irregular Warfare Support (IWS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Complete and deliver assessment of the degree and quality of organizational learning, adaptation, and innovation in the field over the course of the deployment of specific units engaged in IW; provide a framework to speed up and enhance organizational learning in the field; and operationalize framework through instruction/education aids.			
Accomplishments/Planned Programs Subtotals	2.502	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603122D8Z / *Combating Terrorism Technology Support*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	281.005	99.121	148.030	73.002	-	73.002	77.325	82.129	83.186	84.796	Continuing	Continuing
484: *Combating Terrorism Technology Support (CTTS)*	281.005	99.121	148.030	73.002	-	73.002	77.325	82.129	83.186	84.796	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Combating Terrorism Technical Support (CTTS) program identifies capabilities to combat terrorism and irregular adversaries and delivers these capabilities to U.S., interagency, and international users through rapid research and development, advanced studies, and technical innovation. CTTS is expanding its partnerships with other Defense rapid development and acquisition organizations to leverage their expertise as it tries to expedite and transition new and innovative capabilities for Defense and Interagency users.

CTTS major area of emphasis during FY16 and FY17 will be projects to Countering-ISIL. Projects are distributed among 10 mission categories, in line with the interagency Technical Support Working Group (TSWG): Advanced Analytics and Capabilities; Chemical, Biological, Radiological, Nuclear, and Explosives; Improvised Device Defeat; Investigative Support and Forensics; Personnel Protection, Physical Security; Surveillance, Collection, and Operations Support; Tactical Operations Support; Training Technology Development; and a new working group, Irregular Warfare and Evolving Threats.

Specific CTTS areas of emphasis in FY16 and FY17 include Counter-tunnel, Countering-UAVs, Countering-Violent Extremism, and Improving Digital Operations at the tactical level. The CTTS program is a diverse, advanced technology development effort that capitalizes on interagency and international participation to demonstrate the utility and effectiveness of technology when applied to combating terrorism requirements. It includes technology capability development, proof-of-principle demonstrations in field applications, and coordination to transition from development to operational use. CTTS manages approximately 450 individual projects in support of Defense, federal, state, local, and International customers and partners.

The CTTS program justified in the R-2 exhibit identifies the projects fully or partially funded by Congressional appropriations for the CTTS program. However, the Combating Terrorism Technical Support (CTTS) also develops technology and provides support using external funds provided by other DoD and other Federal Departments and International partnerships. These projects and support activities are not necessarily reflected in this justification R-2; but the number of activities do reflect positively on the trust and competence that CTTSO has earned throughout the Department and interagency to rapidly conduct critical RDT&E and provide innovative products.

In FY15, CTTS focused on DoD requirements that supported military forces in demanding or hostile environments such as Iraq, Syria, Afghanistan, and Africa; by rapidly developing and delivering leading edge products such as unmanned vehicles, personal and physical protection, user friendly apps for analytical tools and reference guides, and weapons, sights, and ammo modifications. Several of the highly successful products included a tactical single-man portable collapsible-wing UAV; an enhanced mobile 81mm mortar targeting system mounted on a vehicle; a vehicle mobile tactical tethered ISR system; a vehicle tracking, tagging, and locating device; and the initial OT&E on the Conflict Zone Tool Kit (CZTK) for OCONUS open source data for situation awareness and force protection.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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For U.S. federal, state and local law enforcement and first responders, CTTS completed National Fire Protection Association (NFPA) Class 4 testing on newly developed clothing for emergency medical operations; a spatially offset Raman system to identify material through non-metallic packages; a modified commercial endoscope to collect and package a CB agent from tight spaces; a tool for remotely opening a vehicle trunk locking mechanism; and a field-deployable system for automated rapid processing of human DNA profiles. CTTS also hosted interagency and foreign partner information exchange seminars and capability exercises to share and enhance response techniques and procedures for first responders and data sharing related to Homemade Explosives.

At the tactical level, CTTS will increasingly address technology requirements requested from USSOCOM's field components as they increase their regional operations tempo in Iraq, Syria, and Africa. CTTS will address personnel and physical security for small forces deployed to austere and hostile environments. Another area of increased emphasis will be the protection of U.S. personnel, to include State Department personnel in embassy and consulate locations overseas that need increased security. Additionally, in response to congressional direction, CTTS will increase its partnership with Israel to address their tunnel threat and ensure the joint ventures are beneficial U.S. counter-tunnel activities.

CTTS will continue to actively support the Department's Homeland Defense mission for advanced technology and capabilities that will (1) enhance security along the U.S. Southwest Border and (2) proactively address improvised devices and other chemical, biological, nuclear and radiological threats in a domestic environment. Additionally, CTTS will assist federal; state and local law enforcement in improving their capabilities investigate and mitigate acts of terrorism in CONUS.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	94.541	71.171	73.706	-	73.706
Current President's Budget	99.121	148.030	73.002	-	73.002
Total Adjustments	4.580	76.859	-0.704	-	-0.704
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	77.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	6.365	-			
• SBIR/STTR Transfer	-1.748	-			
• Internal Adjustments	-0.037	-0.141	-0.704	-	-0.704

Change Summary Explanation

FY 2017 realignments and other reductions were in support of Departmental efficiencies and economic assumptions.

The FY 2016 increase is a result of $37 million Congressional increase to the base and $40 million in OCO funding.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Analytic Capabilities (AAC)	7.986	8.621	5.019

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Description: The Advanced Analytics Capabilities (AAC) Subgroup's objective is to develop and deploy integrated analytic capabilities; enabling Warfighters and Mission Partners to make better/faster decisions at the "Tactical Edge". AAC projects improve sense-making, decision-making, and data management across a range of mission areas.

FY 2015 Accomplishments:
Completed development of a prototype entity extraction/guided clustering software that significantly improves the quality and accuracy of data analyses by enabling analysts to change relationships in the data in real-time as part of a “guided clustering” capability while automating the actual analysis. Completed integration of Realistic Decision Models into Model Predictive Controller and demonstrated data injection capabilities and reduced Subject Matter Expert dependence with user communities. Completed Phase One study to determine a social sciences based method for the development of a measures of effectiveness tool that gauges the efficacy of inform and influence activities and allows Military Information Support Operations (MISO) to demonstrate measureable outcomes resulting from operations. Continued the development of an enhanced Critical Thinking Tool that supports the application of evidence-based reasoning for intelligence questions and captures analytic problem-solving approaches. Continued integration and initial operational evaluation of an Interagency analytic and situational awareness platform that enables fusion of existing sensors, social media, and analytic systems into a single platform. Continued initial operational assessment of the Model Predictive Controller and evaluated it with user communities in order to demonstrate significant improvements in identifying the quantity and quality of alternative courses of action, better decision making, and resource optimization. Continued development and assessment of a secure multi-intelligence collection and distributed processing platform with an open Application Programming Interface architecture capable of operating within a network. Initiated development of a target and asset management system to provide users that incorporates Intelligence, Meteorological, and Oceanographic information as well as adversary behavior to allow for the most efficient allocation of limited resources against an uncertain target set. Initiated development of a platform to support the quick reference and visualization of groups, group relationships, and evolving group dynamics that will enable analysts and field operators to quickly identify potential opportunities and risks in evolving operating environments. Initiated development of a visual information system for intelligence and operations networks in an easy to use mission planning tool that accounts for terrain and threats and is easy to use for the lowest echelon of user. Initiated development of an active methodology to collect structured data and messaging using crowdsourcing techniques which are integrated with passive monitoring of the web.

FY 2016 Plans:
Complete the development of an enhanced Critical Thinking Tool that supports the application of evidence-based reasoning for intelligence questions and captures analytic problem-solving approaches. Complete technical integration, operational evaluations, and transition of an Interagency analytic and situational awareness platform. Complete initial prototype for field evaluation and testing with user communities of Model Predictive Controller by demonstrating significant improvements in identifying the quantity and quality of alternative courses of action, better decision making, and resource optimization. Continue development,

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
assessment, and accreditation of a secure multi-intelligence collection and distributed processing and sensor fusion platform with an open Application Programming Interface architecture. Continue development of a target and asset management system to provide users that incorporates Intelligence, Meteorological, and Oceanographic information as well as adversary behavior that allows for the most efficient allocation of limited resources against an uncertain target set. Complete development of a platform to support the quick reference and visualization of groups, group relationships, and evolving group dynamics that will enable analyst and field operators to quickly identify potential opportunities and risks in evolving operating environments. Complete development of a visual information system for intelligence and operations networks that results in an easy to use mission planning tool that accounts for terrain and threats that is easy to use for the lowest echelon of user. Continue development of user centric campaign design and planning interface that provides operational users the ability to quickly design, launch, and adjust a structured data collection and analysis campaign at the operational edge. Initiate the development of simple, friendly interface, customized analytic capabilities that allow tactical operators to quickly compute and analyze information in order to reduce process time penalty and distractions so that operators can better allocate mental resources and attention. Initiate development of Operate to Know CONOPS and tools necessary to create a continuous receive-respond and collect-pulse connection between intelligence and operations to investigate, test, and understand the environment in order to take decisive action. Initiate development of Geo-centric Social Media Exploitation (GeoSME) System to improve social media exploitation efficiency and accuracy, which will selectively collect data from either original sources or archived data according to existing intelligence requirements (IR) allowing analysts to set up alerts and to receive reports when new social media information becomes available.			
FY 2017 Plans: Complete development, assessments, and support transition of a secure multi-intelligence collection and distributed processing and sensor fusion platform with an open Application Programming Interface architecture. Complete testing, integration, and transition support of a target and asset management system for users by incorporating Intelligence, Meteorological, and Oceanographic Information as well as adversary behavior that allows for the most efficient allocation of limited resources against an uncertain target set. Enhance Model Predictive Controller to identify and assess indirect strategies as well as develop response options against associated types of Gray Zone conflicts. Complete development of user centric campaign design and planning interface that provides operational users the ability to quickly design, launch, and adjust a structured data collection and analysis campaign at the operational edge. Initiate development of a Tactical Micro Cloud Server (T-MCS) that will be a secure, rugged, man-packable or fixed mount data server that connects to tactical network devices. Continue the development of simple, friendly interface, customized analytic capabilities that allow tactical operators to quickly compute and analyze information in order to reduce process time penalty and distractions so that operators can better allocate mental resources and attention. Continue development, integration, evaluation, and field testing required to apply Operate to Know CONOPS and tools necessary to create a continuous receive-respond and collect-pulse connection between intelligence and operations to investigate, test, and understand the environment in order to take decisive action to field operations. Continue the development of Geo-centric Social Media Exploitation (GeoSME) System to improve social media exploitation efficiency and accuracy, which will selectively collect			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
data from either original sources or archived data according to existing intelligence requirements (IR) allowing analysts to set up alerts and to receive reports when new social media information becomes available.			
Title: CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR, AND EXPLOSIVES (CBRNE)	12.096	15.100	11.049
Description: The CBRNE subgroup's objective is to improve defense capabilities to meet tomorrow's CBRNE threats. To meet this objective, the subgroup focuses on rapid research, development, test and evaluation on threat characterization; materials attribution; personal protective equipment; detection of CBRNE materials at trace and bulk levels at point, proximity and stand-off distances; development of information resources and decision support tools to assist response elements with risk-based decision making; and consequence management for post-event activities. ***FY 2015 Accomplishments:*** Completed National Fire Protection Association (NFPA) 1999 and NFPA 1994 Class 4 testing on protective clothing for emergency medical operations. Completed development of a decision support tool for determining proper work/rest cycles for response personnel in chemical and biological (CB) protective clothing to mitigate heat-related illnesses. Completed the revision process for the American Society for Testing and Materials (ASTM) enhanced liquid tight integrity testing method/procedures for the evaluation of CB protective ensembles. Completed development of a spatially offset Raman technology capable of identifying materials through non-metallic packaging. Completed development of a handheld, explosives particulate detector for inorganic homemade explosives threats. Completed an evaluation of the effects of decontamination products on deoxyribonucleic acid (DNA) signatures of interest. Completed development of a next generation portable glove box suitable for working with chemical, biological, radiological, and nuclear (CBRN) materials in field operations. Completed development of a modified commercial endoscope capable of CB agent collection that can be manipulated into tight spaces. Initiated and completed a study on the stability of the Ebola virus variant from the 2014 outbreak on surfaces of interest in clinical matrices. Initiated and completed a study on the effects of commercial off-the-shelf decontamination products of the Ebola virus variant from the 2014 outbreak on surfaces of interest, in temperatures representative of clinical settings both in the United States and West Africa. Continued field evaluations of a next generation CB glove for improved comfort and dexterity. Continued field evaluations of a next generation CB sock for improved comfort. Continued development of analytical and sampling procedures for the non-destructive evaluation of CB protective clothing for key contaminants in the field. Continued development of a powder material with imbedded chemical detection and decontamination properties. Continued development of a radio-frequency identification (RFID) detection technology for explosives, solid oxidizers, and fumigants in packages and cargo. Continued development of a miniature, hand-portable mass spectrometer for the detection of chemical and explosive threats. Continued development and validation of an apparatus suitable for studying biological aerosols under environmentally realistic conditions to update source terms for hazard prediction models. Continued development of an unobtrusive, colorimetric detection system capable of discreetly notifying the operator of a positive detection of select chemical warfare agents (CWAs).			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
"Continued to conduct a feasibility study on a novel, miniaturized chemiresistor wearable sensor which enables detection of low concentrations of chemicals in an urban environment. Continued development of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. Continued the evaluation of advanced analytical platforms, tools, and databases for the analysis and incorporation of improvised CB agent production methods. Continued to evaluate potential methods of production of threat materials, and identify key indicators and warnings for response personnel. Continued field evaluations of a new CB protective mask capable of interoperability with tactical equipment for use in tactical environments. Continued development of decision support tools to provide on-scene responders with evidence-based information to support decision making for emergency medical response to chemical events, chemical detection, radiological response, firefighting guidance, and countering improvised explosive threats. Continued development of an optimized sampling media for the collection of trace explosive materials. Continued development of next generation sensors for use in trace, bulk, proximity, and stand-off detection of explosives-based threats. Continued development of enhanced sampling materials and systems for CBRNE threats. Continued development of a risk-based decision support model for skin decontamination in the case of dermal exposures to CWAs. Continued support of the Quadrilateral Group on Chemical, Biological and Radiological (CBR) Counterterrorism. Initiated development of a water filtration system capable of producing potable water for 20-50 operators in austere conditions. Initiated a study on the deposition and transport of CWAs in organs post mortem to support science-based decision making procedures when handling/preparing bodies that have been exposed to CWAs. Initiated a study to systematically evaluate gas forming reactions that could be used in improvised chemical devices. Initiated development of a low cost, handheld Raman system for the detection of explosive and chemical threats. Initiated development of a microfluidic paper-based analytical device for in-field screening of organic explosives. Initiated testing and evaluation of colorimetric fabrics for the detection of bulk explosive materials. Initiated development of a standardized, evidence-based fire literacy program to address shortcomings of current approaches in current fire safety and survival training. Initiated development of a ruggedized garment which provides NFPA 1994 Class 3 and NFPA 1992 protection. Initiated development of new algorithms that increase the specificity and improve the overall utility of commercial Raman explosive detection systems. Initiated development of a flexible, versatile, and easily transportable platform for detection of small amounts of explosive materials hidden inside of portable electronic devices using a combination of passive and active technologies. Initiated development of a modular computer/web-based training package for hand-held explosive detection technologies. Initiated development of a scalable vacuum evidentiary collection device for the collection and preservation of known or suspected biological agent powders. Initiated a study to update urban dispersion models to improve the ability to characterize deposition patterns in realistic radiological dispersion device (RDD) events. Initiated a study of clean-up procedures for contaminated areas after a RDD event. Initiated a study to demonstrate, measure, and understand the mechanisms of improvements in defeat or disablement of CB threats using weapons that employ structural reactive materials (SRMs). Initiated development of a National Institute for Occupational Safety and Health (NIOSH) certified 15-min CBRN protection escape hood capable of fitting in the pocket of a suit jacket that also passes the flammability, heat resistance and carbon monoxide (CO) protection requirements for a combination CBRN/CO capability.			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Initiated development of wireless communications that provide the ability to communicate without breaching the CBRN suit integrity or requiring an electrical pass-through. Initiated development of a ruggedized one piece garment which provides NFPA 1994 Class 2 protection from exposure to the harmful effects of all traditional CB warfare agents and toxic industrial chemicals (TICs) listed in NFPA 1994, 2012 edition while allowing for communication and interoperability with tactical equipment. Initiated testing of new methods to more effectively and efficiently collect nanogram quantities of commercial, military, and homemade explosives that are present near improvised explosive devices.			
FY 2016 Plans: Complete field evaluations and integrate a next generation CB glove into an ensemble for NFPA 1994 Class 3 certification testing. Complete field evaluations and integrate a next generation CB sock into an ensemble for NFPA 1994 Class 3 certification testing. Complete incorporation of analytical and sampling procedures for the non-destructive evaluation of CB protective clothing for key contaminants in the field into a decision support matrix. Complete development of a powder material with imbedded chemical detection and decontamination properties. Complete development of a RFID detection technology for explosives, solid oxidizers, and fumigants in packages and cargo. Complete development of a miniature, hand-portable mass spectrometer for the detection of chemical and explosive threats. Complete development of an apparatus suitable for studying biological threat aerosols under environmentally realistic conditions to update source terms for hazard prediction models. Continue test and evaluation of an unobtrusive colorimetric detection system for the detection of CWAs. Continue testing and evaluation of a novel, miniaturized chemiresistor wearable sensor which enables detection of low concentrations of chemicals in an urban environment. Continue testing and evaluation of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. Continue development of a database and advanced analytical tools for the analysis of improvised CB agent production methods. Continue evaluation of potential methods of production of threat materials, and identify key indicators and warnings for response personnel. Continue field evaluations of a new CB protective mask capable of interoperability with tactical equipment for use in tactical environments. Continue development of decision support tools to provide on-scene responders with evidence-based information to support decision making for emergency medical response to chemical events, chemical detection, radiological response, firefighting guidance, and countering improvised explosive threats. Continue testing and evaluation of optimized sampling media for the collection of trace explosive materials. Continue testing and evaluation of next generation sensors for use in trace, bulk, proximity, and stand-off detection of explosives-based threats. Continue evaluation of enhanced sampling materials and systems for CBRNE threats. Continue development of a risk-based decision support model for skin decontamination in the case of dermal exposures to CWAs. Continue support of the Quadrilateral Group on CBR Counterterrorism. Complete development of a water filtration system capable of producing potable water for 20-50 operators in austere conditions. Complete a study on the deposition and transport of CWAs in organs post mortem to support science based decision making procedures when handling/preparing bodies that have been exposed to CWAs. Complete the systematic evaluation of gas forming reactions that could be used in improvised chemical devices. Complete development of a low cost, handheld Raman system for the detection of explosives and chemical threats. Complete development			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and commercialize a microfluidic paper-based analytical device for in-field screening of organic explosives. Complete transition colorimetric fabric technology to a commercialization partner. Complete development of a standardized, evidence-based fire literacy program to address shortcomings of current approaches in current fire safety and survival training. Continue development and initiate field evaluations of a ruggedized garment which provides NFPA 1994 Class 3 and NFPA 1992 protection. Continue development of new algorithms that increase the specificity and improve the overall utility of commercial Raman explosive detection systems. Continue development of a flexible, versatile, and easily transportable platform for detection of small amounts of explosive materials hidden inside of portable electronic devices using a combination of passive and active technologies. Continue development and evaluation of a modular computer/web-based training package for hand-held explosive detection technologies. Continue development of a scalable vacuum evidentiary collection device for the collection and preservation of known or suspected biological agent powders. Continue updating source terms for urban dispersion models to improve the ability to characterize deposition patterns in realistic RDD events. Continue best practices for clean-up procedures for contaminated areas after a RDD event. Continue demonstrating, measuring, and understanding the mechanisms of improvements in defeat or disablement of CB threats using weapons that employ SRM. Continue development of a NIOSH certified 15-min CBRN protection escape hood capable of fitting in the pocket of a suit jacket that also passes the flammability, heat resistance and CO protection requirements for a combination CBRN/CO capability. Continue development of wireless communications that provide the ability to communicate without breaching the CBRN suit integrity or requiring an electrical pass-through. Continue development of a ruggedized one piece garment which provides NFPA 1994 Class 2 protection from exposure to the harmful effects of all traditional CB warfare agents and TICs listed in NFPA 1994, 2012 edition while allowing for communication and interoperability with tactical equipment. Continue testing new methods to more effectively and efficiently collect nanogram quantities of commercial, military, and homemade explosives that are present near improvised explosive devices. Initiate CBRN respirator testing against additional TICs representative of the current threats encountered. Initiate development of multiple use biological personal protective equipment which provides NFPA 1999, Standards on Protective Clothing for Emergency Medical Operations, protection, with dual certification to NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, Class 4 protection. Initiate development of a hazmat technician level, skills-based training program to prepare hazmat operators to use risk-based selection mechanisms to determine the appropriate level or personal protective equipment. Initiate development of a hazmat technician level, skills-based training program to prepare hazmat operators to use evidence-based selection mechanisms to develop and/or choose the appropriate mass decontamination protocols for a given situation. Initiate development of assessment tools and criteria to properly rank and qualify commercial cooling systems to use with CBRNE PPE. Initiate development of a small, low-cost, disposable sampler, containment vessel, and adapter to be used in sampling of broad spectrum chemical residues on operational surfaces. Initiate development of a portable, non-contact small baggage scanner for positive identification of explosives and firearms. Initiate development of next generation evidence packaging for the safe transport of CBRN materials. Initiate an international assessment of a novel genomic sequencing standard for forensic DNA metagenomics. Initiate a study on a next generation sequencing technology for potential applications in field deployed			

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laboratories. Initiate an effort to establish a network/infrastructure, including enhancing existing in-county laboratory capabilities, for the collection of environmental samples in Ebola virus endemic regions of Africa for subsequent genomic analysis.

FY 2017 Plans:

Complete development of an unobtrusive, colorimetric system for the detection of CWAs and TICs of concern. Complete development and commercialize a novel, miniaturized chemiresistor wearable sensor which enables detection of low concentrations of chemicals in an urban environment. Complete development of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. Complete development of an advanced analytical database for the analysis of improvised CB agent production methods. Complete evaluation of potential methods of production of threat materials, and identify key indicators and warnings for response personnel. Complete field evaluations and certify a ruggedized garment which provides NFPA 1994 Class 3 and NFPA 1992 protection.

Complete development of new algorithms that increase the specificity and improve the overall utility of commercial Raman explosive detection systems. Complete development of a flexible, versatile, and easily transportable platform for detection of small amounts of explosive materials hidden inside of portable electronic devices using a combination of passive and active technologies. Complete development of a modular computer/web-based training package for hand-held explosive detection technologies. Complete development of a scalable vacuum evidentiary collection device for the collection and preservation of known or suspected biological agent powders. Complete source term development for urban dispersion models to improve the ability to characterize deposition patterns in realistic RDD events. Complete best practices for clean-up procedures for contaminated areas after a RDD event. Complete evaluation of SRMs. Continue to conduct verification and validation testing of a new CB protective mask capable of interoperability with tactical equipment for use in tactical environments. Continue decision support tools to provide on-scene commanders with evidence-based information to support decision making for emergency response to CBRNE events. Continue testing and evaluation of optimized sampling media for the collection of trace explosive materials. Continue testing and evaluation of a next generation sensors for use in trace, bulk, proximity, and stand-off detection of explosives-based threats. Continue evaluation of enhanced sampling materials and systems for CBRNE threats. Continue development of a risk-based decision support model for skin decontamination in the case of dermal exposures to CWAs. Continue support of the Quadrilateral Group on CBR Counterterrorism. Continue testing of a NIOSH certified 15-min CBRN protection escape hood capable of fitting in the pocket of a suit jacket that also passes the flammability, heat resistance and CO protection requirements for a combination CBRN/CO capability. Continue testing of wireless communications that provide the ability to communicate without breaching the CBRN suit integrity or requiring an electrical pass-through. Continue to conduct field evaluations of a ruggedized one piece garment which provides NFPA 1994 Class 2 protection from exposure to the harmful effects of all traditional CB warfare agents and TICs listed in NFPA 1994, 2012 edition while allowing for communication and interoperability with tactical equipment. Continue testing new methods to more effectively and efficiently collect nanogram quantities of commercial, military, and homemade explosives that are present near improvised explosive devices. Continue CBRN respirator testing against additional TICs representative of the current threats encountered. Continue development of

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multiple use biological PPE which provides NFPA 1999, Standards on Protective Clothing for Emergency Medical Operations, protection, with dual certification to NFPA 1994, Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents, Class 4 protection. Continue development of a hazmat technician level, skills-based training program to prepare hazmat operators to use risk-based selection mechanisms to determine the appropriate level of personal protective equipment. Continue development of a hazmat technician level, skills-based training program to prepare hazmat operators to use evidence-based selection mechanisms to develop and/or choose the appropriate mass decontamination protocols for a given situation. Complete development of assessment tools and criteria to properly rank and qualify commercial cooling systems to use with CBRNE PPE. Continue development of a small, low-cost, disposable sampler, containment vessel, and adapter to be used in sampling of broad spectrum chemical residues on operational surfaces. Continue development of a portable, non-contact small baggage scanner for positive identification of explosives and firearms. Complete development of next generation evidence packaging for the safe transport of CBRN materials. Continue assessment of novel genomic sequencing standards for forensics DNA metagenomics. Continue development of a next generation sequencing technology for potential applications in field deployed laboratories. Continue establishment of a network/infrastructure, including enhancing existing in-county laboratory capabilities, for the collection of environmental samples in Ebola endemic regions of Africa for subsequent genomic analysis.			
Title: IMPROVISED DEVICE DEFEAT (IDD)	3.478	5.100	4.422
Description: The IDD/EC Subgroup's objective is to deliver capability to defeat and neutralize the full spectrum of terrorist explosive devices. IDD/EC improves the operational capabilities of federal, state, and local bomb squads and the U.S. military Explosive Ordnance Disposal (EOD) community delivers by developing and delivering advanced technologies, tools, and information to defeat explosive devices. In collaboration with military, federal, state, and local agencies, the IDD/EC Subgroup identifies and prioritizes multi-agency user requirements through joint working groups. IDD/EC then actively works with vendors and end-users to deliver advanced prototype systems that provide more efficiency and greater safety for Bomb Technicians to investigate, access, evaluate, and if needed render safe or dispose of suspect devices whether emplaced, person borne, vehicle borne or water borne. The Subgroup supports the Homeland Security Presidential Directive (HSPD) 19 – Combating Terrorist Use of Explosives in the United States and the National Strategic Plan for Bomb Squads.			
FY 2015 Accomplishments: In support of PPD 17 – Countering Improvised Explosive Devices, the Improvised Device Defeat (IDD) subgroup transitioned to a new name, Improvised Device Defeat/Explosives Countermeasures (IDD/EC), but continues to support requirements of both military Explosive Ordnance Disposal (EOD) technicians and Public Safety Bomb Squads. Explosives Countermeasures encompasses other explosive threats and hazards that are encountered by other first responders. The remaining projects under EOD/LIC transitioned over to IDD/EC at the beginning of FY15. The IDD/EC subgroup completed development and evaluation to commercialize an explosively initiated tool for remotely opening vehicle trunk locking mechanisms. Continued development and operational evaluation of a submersible remotely operated vehicle to counter water borne IEDs. Completed development and			

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delivered for operational test and evaluation a Force Feedback Retrofit Kit to provide enhanced visual awareness of pressures exerted on object held in a robot gripper. Initiated development of a robotically conducted on-site desensitization and disposal of sensitive homemade explosives (HMEs) achieved by mixing small quantities of the target HME with a flammable liquid followed by incineration. Initiated development of a mobile device application for worldwide incidents involving improvised explosive device technical data accessible to bomb technician. Initiated development of a decision support tool that covers the full range of issues involved in vehicle-borne improvised explosive device (VBIED) response by bomb disposal personnel. Continued development of a modified and environmentally hardened remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Completed development of a threat analysis on the use of additive manufacturing processes for construction and concealment of devices containing explosives or their precursors. Initiated development of a system that can employ X-ray image analytics at the scene of a bomb or IED incident to instantly and automatically identify bomb or IED components from a database of exemplars. Initiated development of a lightweight IED protective suit and ballistic helmet to allow increased freedom of movement during counter-IED operations.			
FY 2016 Plans: Complete development and deliver prototypes for operational testing and evaluation of a submersible remotely operated vehicle to counter water borne IEDs. Complete development and commercialize a capability to robotically conduct on-site desensitization and disposal of sensitive homemade explosives (HMEs) by mixing small quantities of the target HME with a flammable liquid followed by incineration. Complete development of a mobile device application for worldwide incidents involving improvised explosive device technical data accessible to bomb technician. Complete Development of a decision support tool that covers the full range of issues involved in vehicle-borne improvised explosive device (VBIED) response by bomb disposal personnel. Complete development and delivery of a compact, high-power next generation X-ray generator for EOD use. Continue development of an environmentally hardened, remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Complete development of a compact, high-power next generation X-ray generator for EOD use. Complete development of a system that can employ X-ray image analytics at the scene of a bomb or IED incident to instantly and automatically identify bomb or IED components from a database of exemplars. Complete development of a lightweight IED protective suit and ballistic helmet to allow increased freedom of movement during counter-IED operations. Initiate development of a low cost, disposable RF firing system for firing commercial blasting caps. Initiate development of a scalable 3D Computer Assisted Design (CAD) models on non-patented bomb squad render safe tools. Initiate development of a device defeat application that allows bomb technicians to select disruption tools based on automated X-ray diagnostics. Initiate development of a detailed analysis of the use of additive manufacturing to build and conceal explosive devices. Initiate exploitation of improvised electric detonators and igniter components.			
FY 2017 Plans: Complete development and commercialize an environmentally hardened, remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Complete development of a low cost, disposable RF firing system for firing commercial blasting			

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caps. Complete development of a scalable 3D Computer Assisted Design (CAD) models on non-patented bomb squad render safe tools. Complete development of a device defeat application that allows bomb technicians to select disruption tools based on automated X-ray diagnostics. Complete development of a detailed analysis of the use of additive manufacturing to build and conceal explosive devices. Complete exploitation of improvised electric detonators and igniter components. Initiate development of an EOD robot-mounted X-ray backscatter imaging system. Initiate development of enhanced capabilities for a submersible remotely operated vehicle to counter water borne IEDs based on operational capability assessment. Initiate an East Coast-based capability exercise to develop and test advanced skills to maneuver hazardous duty robots in challenging, real-world scenarios.			
Title: INVESTIGATIVE AND FORENSICS SCIENCE	4.840	4.840	4.472
Description: The IFS subgroup's objective is to advance combating terrorism capabilities in investigative and forensic science. IFS supports joint, interagency, and other partners who apply investigative and forensic science methods, means, or practices to forensic intelligence or practices to forensic intelligence or investigations. To meet this objective, the subgroup focuses on rapid research, development, test and evaluation of new and advanced technology, equipment, forensic techniques, and tools, as well as development of information resources and decision support tools for risk-based decision making and rapid exploitation of evidence. Projects emphasize rapid and field DNA analysis, identification of insider threat within agencies, pre- and post-blast forensic examination, electronic evidence data acquisition and analysis, sensitive site exploitation, forensic intelligence, and criminalistics. ***FY 2015 Accomplishments:*** Completed the secondary phase of the interagency research, development, test, and evaluation strategy and roadmap for the federal investigative and forensic science community. Completed development of the best practices for expeditionary forensic operations. Completed testing and evaluation of commercially available rapid DNA instruments for use in combating terrorism operations. Completed development of an effective forensic microbial proteomic methodology for biological samples to aid in source attribution. Completed development of a field-deployable prototype system for automated rapid processing of human DNA profiles using short tandem repeat loci. Completed development of advanced methods to analyze visual, verbal, and behavioral cues of persons to determine their likelihood of being an insider threat to commit physical violence, espionage, and sabotage and build a network of researchers to further advancements in this field. Completed development of a more productive and effective method of interrogating and interviewing persons for human intelligence collection in law enforcement and tactical environments. Completed development of a forensic opium poppy DNA methodology to determine the geographic origin of heroin. Completed development of an advanced facial thermal imaging technology to determine credibility and intent. Completed development of an automated system that creates identifications, intelligence, and analysis of forensic and criminal information from multiple, diverse, and proprietary databases. Completed development of protein polymorphism methodology and database, isolating protein markers from hair follicles. Continue development of a comprehensive forensic procedure to separate mixed samples DNA			

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by using nuclear DNA. Initiated the development of an automatic tool that recognizes and identifies faces in uncontrolled files and images. Initiated the development of a remote identification card image system for the detection of suspected fraudulent ID cards at checkpoints. Initiated development of a tool that automatically ingests and analyzes data from mobile device extraction tools and produces intelligence reports. Initiated development of mobile device corpus to track, exploit, and store electronic evidence. Initiated development of a methodology to identify and exploit organic and inorganic compounds found in AN/CAN samples for geographical sourcing. Initiated development of a methodology to identify and exploit organic and inorganic compounds found in AN/CAN samples for geographical sourcing.			
FY 2016 Plans: Complete development of a comprehensive forensic procedure to separate mixed samples DNA by using nuclear DNA. Complete the development of an automatic tool that recognizes and identifies faces in uncontrolled files and images. Complete the development of a remote identification card image system for the detection of suspected fraudulent ID cards at checkpoints. Complete development of a tool that automatically ingests and analyzes data from mobile device extraction tools and produces intelligence reports. Complete development of mobile device corpus to track, exploit, and store electronic evidence. Complete development of a methodology to identify and exploit organic and inorganic compounds found in AN/CAN samples for geographical sourcing. Complete development of a methodology to identify and exploit organic and inorganic compounds found in AN/CAN samples for geographical sourcing. Initiate development of an advanced and improved system that analyzes, stores, and links data and traits from fraudulent identification and travel documents. Initiate development of forensically validated procedures using high resolution mass spectrometry to determine the geographic source of cultivation and processing of heroin and related opium substances. Initiate development of the forensic analysis methodologies that will have to be used on 3-D printed firearms made with non-metallic materials. Initiate development of a forensic software application that performs searches, matches, and exclusions of vehicle images in still image or video databases. Initiate development of a test bed for standard forensic laboratory equipment in a maritime environment. Initiate development of an advanced non-traditional latent fingerprint detection and visualization method based on novel antibodies and nano-technology approaches.			
FY 2017 Plans: Complete development of an advanced and improved system that analyzes, stores, and links data and traits from fraudulent identification and travel documents. Complete development of forensically validated procedures using high resolution mass spectrometry to determine the geographic source of cultivation and processing of heroin and related opium substances. Complete development of the forensic analysis methodologies that will have to be used on 3-D printed firearms made with non-metallic materials. Complete development of a forensic software application that performs searches, matches, and exclusions of vehicle images in still image or video databases. Complete development of a test bed for standard forensic laboratory equipment in a			

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maritime environment. Complete development of an advanced non-traditional latent fingerprint detection and visualization method based on novel antibodies and nano-technology approaches.			
Title: Irregular Warfare and Evolving Threats (IW/ET)	3.500	9.615	5.168

Description: U.S. Forces face a threat environment where irregular, state-sponsored and non-state hybrid and conventional adversaries armed with easy to employ precision weapons, global surveillance and networking will have the capability to undercut the operational and technical superiority of U.S. Conventional and Special Operations Forces. These evolving threats will progressively blur the boundaries between conventional and irregular warfare. Offering foresight about disruptions of this nature through rapid, adaptive demonstration of novel operational concepts so that concept developers can explore new models and capabilities before a conflict begins must be a primary goal.

The IW/ET subgroup develops new concepts and capabilities for warfighters and inter-agency partners who are confronting the complexity of the current operational environment, while simultaneously looking outward rather than inward to appropriately size, shape and develop their forces. In accordance with the QDR's emphasis on preparation to defeat adversaries and succeed in a wide range of contingencies, IW/ET will engage in operational assessment, concept development, and independent validation of unique prototype capabilities to identify, confront and defeat evolving threats.

FY 2015 Accomplishments:
Completed the development of a non-material effort intended to better understand indirect and irregular threats currently facing the US, and how to implement effective measures against them. This effort will support the Army Special Operations Command and will include wargaming and experimentation, strategy assessment and recommendations for future operations planning. Continued development of the Nightingale effort, which fielded a prototype digital workflow management and content approval capability for members of the Counter Terrorism Strategic Communication community of practice who actively engage on social media platforms. This effort is entirely novel to the United States Government and will provide critical test and evaluation for operational deployment, enabling US operators to more effectively contest the informational domain. Continued research and analysis providing support for: planning and organizing integration of influence capabilities into cyber planning and execution, understanding and planning for the impact and implications of "now media," and planning and organizing to conduct military deception, as well as the distillation and dissemination of best practices in the planning, execution, and assessment of information operations (IO). Continued research and development of a low-cost, effective and efficient method of extending or creating local security, sustainable governance, and protection from terrorism in small and large urban environments through relevant doctrine, training, technology and innovative partnerships. Utilizing Secure Unclassified Network (SUNet) architecture, this effort facilitates dialogue and information sharing among entities involved in developing community resilience/resistance in the face of armed violence and creates a platform to test and evaluate tools and TTPs for use in the "ungoverned" or "under-governed" urban environment. Continued the development and initial testing of a government off the shelf application that integrates and

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fuses heterogeneous social medial data for use in strategic and tactical operational planning and preparation of the battlefield. This effort provides a real time data and analysis capability along with mentorship and the analytical tradecraft to understand and monitor critical events and sentiments in open source social media and will be deployed to support USMC operators. Initiated an effort to research and develop a classified report that makes use of the Open Source Center's open source analytical expertise in order to support mission-enabling research and analysis capabilities for a CTTSO end user. Initiated an operational test of the Network Enablement Capability (NEC) with Special Operations Command Africa called Clever Enabler. This effort will test the ability of Special Operations personnel to deliver the Legacy model with the contractor in select African countries. In addition, the focus of Clever Enabler will expand the Legacy model into an exportable all source intelligence partner nation capacity building effort. Upon completion of the curriculum and a brief test, the contract will transition to US SOCOM in FY16. Initiated an effort to determine how the Department of Defense (DoD), Interagency and Allied Nations conduct partner capacity building operations. The end state is to design a holistic common interagency analytical and planning approach that better identifies capabilities authorities and funding, links US, Allied and partner nation objectives and builds synergy when conducting partner nation capacity building missions. Initiated an effort that developed an analytical framework to provide analysts and planners tools and techniques for understanding the urban operational environment that can be used to support operational design, intelligence preparation of the operational environment, course of action (COA) development, COA analysis, and ultimately COA selection and plan/ order production. These techniques use systems thinking to address urban environments' dynamism and interconnectedness. Initiated the development of new concepts and constructs for understanding the role of virtual currencies in threat finance. This effort will develop statistical models using near real time Blockchain data to determine the probability that a Bitcoin transaction is associated with illicit activities. Initiated and completed a crowd sourced effort to gain innovative insights into virtual currency and new payment technologies to support ongoing interagency and international discussions on the risks and opportunities of this burgeoning technology. Initiated support for the SPOTLIGHT platform which is currently providing field data and an open source information platform to Special Operations Command Central (SOCCENT) for conducting analysis of open source big data (traditional and social media) to support operational planning and sustained situational understanding of the information and media environment. This new initiative expands and standardizes requirements for an automated and integrated open source secure analytical platform. The targeted objective is to allow the command to remotely perform mission critical tasks that result in lower cost over time and improved system performance with lower latency in terms of augmented exploitation of the data for multiple operational requirements. Initiated the development and test of an exportable information operations capability that legitimate governments' can use to counter violent extremist messaging. Conducted testing and evaluation by delivering training and periodic evaluation through the use of mobile advise and assist training teams. Initiated an effort in partnership with UK Dstl to enable analysts to assess higher-order cascading influences and reactions to events, as well as determine the uncertainty that the event will produce the desired results over time. The effort will pull together subject matter experts and existing technology to produce a report documenting findings and data sets in order to help inform current and future operations in a country of strategic interest. This is of significant importance in order to better understand and anticipate the interplay between specific individuals, political/social military organizations, and general society in response to potential courses of actions or events, specifically when			

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it comes to planning and conducting operations in support of or with foreign partners and nations. Initiated an effort to challenge university students from the United States and abroad to create an online community to counter a common enemy of violent extremists wherever they might exist. The teams researched, designed, implemented, and measured the success of a social or digital initiative that: Motivated or empowered people to become involved in countering violent extremism; Catalyzed others to create their own initiatives, products, or tools to counter violent extremism; and Build a community of interest focused on living shared values that counter violent extremism. Initiated the development of an ability to monitor social media, identify and archive communications trends, and disseminate and respond to real-time threats broadcasted through social media in permissive and non-permissive environments using a mobile application that provides real-time open-source and social media situational awareness around a mobile military unit. This capability operationally impacts soldiers on the ground by providing relevant alerts of emerging threats in the immediate area or along a planned route. An essential aspect of the end solution is the ability to persistently monitor around the team or even an individual soldier during movement along both planned and unplanned routes. This solution is highly configurable and extendible, allowing for multiple local and regional data sources to be quickly integrated into the platform. Initiated the development of a mobile and web browser-based platform to collect photographs, videos, audio recordings, and general text-based information via precise crowd sourcing techniques. The objective is to provide an Android-based application that is highly customized for a specific region, language, and purpose to use for crowd source media collection and to establish a secure, controlled-access internet hosting platform of searchable, retrievable, and viewable media for USG and partner nation communicator use, in order to provide timely access to vetted visual media and improve cross-government(s) coordination of relevant content. Additionally, the collected data is automatically geo-tagged and uploaded to a dedicated assigned server. The immediate operational impact is the enhanced ability of users to rapidly collect and share photos, audio, and video in a non-obvious manner from the tactical edge, making compelling visual media content available through improved cross-government cooperation. Initiated development of the Conflict Zone Tool Kit (CZTK) which resides on a secure, unclassified network and empowers non-analytic personnel with leading edge tools and expert instruction to enable near-real time situational awareness from host-nation perspective (‘green lens’) related to activities and actors of concern. This platform is designed for non-intelligence functions in conflict zones outside of the continental U.S. (OCONUS) and focuses exclusively on publicly available information accessible on the internet to enhance the ability of operational personnel to develop and maintain a real time pulse of how terrorist groups make use of open source messaging to recruit, train, and fundraise. Accessible from a standard Internet browser, CZTK offers an accredited plug-and-play platform enabling users to apply the best data and applications needed to characterize and geospatially visualize the information environment for operational level planning and a range of tactical missions.			
FY 2016 Plans: Complete development and operational deployment of the Nightingale effort, a prototype digital workflow management and content approval capability for members of the Counter Terrorism Strategic Communication community of practice who actively engage on social media platforms. This effort is entirely novel to the United States Government and will enable US operators			

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to more effectively contest the informational domain. Complete research and development for providing support: planning and organizing integration of influence capabilities into cyber planning and execution, understanding and planning for the impact and implications of “now media,” and planning and organizing to conduct military deception, as well as the distillation and dissemination of best practices in the planning, execution, and assessment of information operations (IO). Complete research and development of a low-cost, effective and efficient method of extending or creating local security, sustainable governance, and protection from terrorism in small and large urban environments through relevant doctrine, training, technology and innovative partnerships. Utilizing Secure Unclassified Network (SUNet) architecture, this effort facilitates dialogue and information sharing among entities involved in developing community resilience/resistance in the face of armed violence and creates a platform to test and evaluate tools and TTPs for use in the "ungoverned" or "under-governed" urban environment. Complete deployment and transition of a government off the shelf application that integrates and fuses heterogeneous social medial data for use in strategic and tactical operational planning and preparation of the battlefield. This effort provides a real time data and analysis capability along with mentorship and the analytical tradecraft to understand and monitor critical events and sentiments in open source social media and will be deployed to support USMC operators. Complete the expansion and standardization of requirements for an automated and integrated open source secure analytical platform. Upon completion, the SOCCENT command will be able to remotely perform mission critical tasks that result in lower cost over time and improved system performance with lower latency in terms of augmented exploitation of the data for multiple operational requirements. Continue the development and test of an exportable information operations capability that legitimate governments’ can use to counter violent extremist messaging. Conduct testing and evaluation by delivering training and periodic evaluation through the use of mobile advice and assist training teams. Continue an effort in partnership with UK Dstl to enable analysts to assess higher-order cascading influences and reactions to events, as well as determine the uncertainty that the event will produce the desired results over time. The effort will pull together subject matter experts and existing technology to produce a report documenting findings and data sets in order to help inform current and future operations in a country of strategic interest. This is of significant importance in order to better understand and anticipate the interplay between specific individuals, political/social military organizations, and general society in response to potential courses of actions or events, specifically when it comes to planning and conducting operations in support of or with foreign partners and nations. Complete an effort to challenge university students from the United States and abroad to create an online community to counter a common enemy of violent extremists wherever they might exist. The teams research, design, implement, and measure the success of a social or digital initiative that: Motivates or empowers people to become involved in countering violent extremism; Catalyzes others to create their own initiatives, products, or tools to counter violent extremism; and Builds a community of interest focused on living shared values that counter violent extremism. Complete the development of an ability to monitor social media, identify and archive communications trends, and disseminate and respond to real-time threats broadcasted through social media in permissive and non-permissive environments using a mobile application that provides real-time open-source and social media situational awareness around a mobile military unit. This capability operationally impacts soldiers on the ground by providing relevant alerts of emerging threats in the immediate area or along a planned route. An essential aspect of the end solution is the ability to persistently monitor around the team or even an			

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individual soldier during movement along both planned and unplanned routes. This solution is highly configurable and extendible, allowing for multiple local and regional data sources to be quickly integrated into the platform. Complete the development of a mobile and web browser-based platform to collect photographs, videos, audio recordings, and general text-based information via precise crowd sourcing techniques. The objective is to provide an Android-based application that is highly customized for a specific region, language, and purpose to use for crowd source media collection and to establish a secure, controlled-access internet hosting platform of searchable, retrievable, and viewable media for USG and partner nation communicator use, in order to provide timely access to vetted visual media and improve cross-government(s) coordination of relevant content. Additionally, the collected data is automatically geo-tagged and uploaded to a dedicated assigned server. The immediate operational impact is the enhanced ability of users to rapidly collect and share photos, audio, and video in a non-obvious manner from the tactical edge, making compelling visual media content available through improved cross-government cooperation. Continue development of the Conflict Zone Tool Kit (CZTK) which resides on a secure, unclassified network and empowers non-analytic personnel with leading edge tools and expert instruction to enable near-real time situational awareness from host-nation perspective ('green lens') related to activities and actors of concern. This platform is designed for non-intelligence functions in conflict zones outside of the continental U.S. (OCONUS) and focuses exclusively on publicly available information accessible on the internet to enhance the ability of operational personnel to develop and maintain a real time pulse of how terrorist groups make use of open source messaging to recruit, train, and fundraise. Accessible from a standard Internet browser, CZTK offers an accredited plug-and-play platform enabling users to apply the best data and applications needed to characterize and geospatially visualize the information environment for operational level planning and a range of tactical missions. Continue to develop and deliver Secure Unclassified Network (SUNet) which provides a unique virtualization of a single hardware suite of servers and software that will provide protected dynamic enclaves of capability for multi-agency users (Law Enforcement, Interagency, Coalition, and Foreign Nationals). This effort enables an inter-organizational collaborative area and enhanced capabilities of data upload, searching and sharing from headquarters down to smartphones, tablets or laptops. Initiate an effort to develop an assessment methodology that will assist counterterrorism strategic messaging by enhancing the ability to use publicly available information to identify key influencers, derive linguistically and culturally accurate insights for message development, and then measure the impact and resonance of such messages. As terrorist groups continue to propagate their narratives through internet-enabled social media, the US and her allies need new tools and methodologies to fully understand the scope of terrorist groups' online messaging campaigns, successfully counter violent and extremist messages, and to create, enrich, and sustain a persuasive, relevant, and positive narrative in this virtual battlefield. This effort will enable users to capture and share resonance data with other users, enabling them to create and sustain more effective messaging while allowing for faster adjustment and tailored response to adversary communications. Initiate an effort that will bolster rewards programs by better understanding how to address the "street-level" community information that may provide—for cents rather than thousands of dollars--indicators of instability and violence of interest to the USG and its foreign partners. Phone and walk-in based reporting fail to incorporate the potential to dramatically increase the volume, information security, and quality of reporting possible through crowdsourcing applications, particularly when combined with the micro-payment processing breakthrough afforded by Blockchain technology. To explore the potential			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
of this new reporting paradigm, initiate a project to develop and test a prototype methodology and application that would enable automated and incentivized reporting by civilians of images, text and/or video in zones of conflict in exchange for micro-payments or tip-sized rewards. Initiate an effort to develop a web-based software application framework that can visualize and monitor the online social network terrain using publicly available information. The importance of this domain is increasing at an all-time high as violent extremist organizations (VEO) successfully use social media to recruit, train, fundraise, and command and control on-the-ground military operations. Anecdotal success stories gleaned from Twitter or other media is insufficient, especially when repeatable, systematic approaches for exploiting this environment are absent. This tool will be integrated into CTTSO's Conflict Zone Tool Kit (CZTK) and will set the foundation for military planners and senior leaders to visualize and understand key terrain in online social networks. Initiate an effort that will address a gap in understanding the strategy and concepts of how to foster effective Counter Unconventional Warfare (UW) in the modern age. This effort will explore and inform strategy and concepts focused on how a country prepares itself to conduct resistance against an occupying aggressor and what measures and actions a country can take prior to occupation. This effort will provide an opportunity to gain insight into the phenomenon of resistance and modern counter UW by looking through the lens of current events in Ukraine. It will draw lessons from the historical cases and, where appropriate, will derive comparisons with current events in the Ukraine. A key element will be to understand variables that lead to failure in the former Soviet Republics or other select regions. Complete the Lawfare initiative, which will provide applicable lessons from literature and expert practitioners on Lawfare and other analogous policy tools. The effort will also provide recommendations for a framework outlining how the US and its allies can effectively defend against and conduct offensive legal warfare.			
FY 2017 Plans: Complete the design of a holistic common interagency analytical and planning approach that better identifies capabilities authorities and funding, links US, Allied and partner nation objectives and builds synergy when conducting partner nation capacity building missions. Upon completion, the analytical and planning approach will be available for use in interagency and allied nation training curriculum. "Complete the development and test of an exportable information operations capability that legitimate governments' can use to counter violent extremist messaging. Conduct testing and evaluation by delivering training and periodic evaluation through the use of mobile advise and assist training teams. Upon completion, the USG will have an exportable information operations model that can be used in select partner nations. Complete an effort in partnership with UK Dstl to enable analysts to assess higher-order cascading influences and reactions to events, as well as determine the uncertainty that the event will produce the desired results over time. The effort pulls together subject matter experts and existing technology to produce a report documenting findings and data sets in order to help inform current and future operations in a country of strategic interest. This is of significant importance in order to better understand and anticipate the interplay between specific individuals, political/social military organizations, and general society in response to potential courses of actions or events, specifically when it comes to planning and conducting operations in support of or with foreign partners and nations. Complete development of the Conflict Zone Tool Kit which resides on a secure, unclassified network and empowers non-analytic personnel with leading edge			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
analytical tools and expert instruction, to enable near-real time situational awareness from host-nation perspective ('green lens'), related to activities and actors of concern. This platform is designed for non-intelligence functions in conflict zones outside of the continental U.S. (OCONUS) and focuses exclusively on publicly available information accessible on the internet to enhance the ability of operational personnel to develop and maintain a real time pulse of how terrorist groups make use of open source messaging to recruit, train, and fundraise. Complete development and delivery of Secure Unclassified Network (SUNet) which provides a unique virtualization of a single hardware suite of servers and software that will provide protected dynamic enclaves of capability for multi-agency users (Law Enforcement, Interagency, Coalition, and Foreign Nationals). This effort enables an inter-organizational collaborative area and enhanced capabilities of data upload, searching and sharing from headquarters down to smartphones, tablets or laptops. Complete an effort to develop an assessment methodology that will assist counterterrorism strategic messaging by enhancing the ability to use publicly available information to identify key influencers, derive linguistically and culturally accurate insights for message development, and then measure the impact and resonance of such messages. As terrorist groups continue propagate their narratives through internet-enabled social media, the US and her allies need new tools and methodologies to fully understand the scope of terrorist groups' online messaging campaigns, successfully counter violent and extremist messages, and to create, enrich, and sustain a persuasive, relevant, and positive narrative in this virtual battlefield. This effort will enable users to capture and share resonance data with other users, enabling them to create and sustain more effective messaging while allowing for faster adjustment and tailored response to adversary communications. Continue an effort to bolster DOD and Law Enforcement rewards programs through development of a civil reporting application and methodology. This effort will conduct an experiment in realistic field conditions to thoroughly test the feasibility and efficacy of civil reporting incentivized by micropayments in zones of disorder and conflict. Complete an effort to develop a web-based software application framework that can visualize and monitor online social network terrain using publicly available information. The importance of this domain is increasing at an all-time high as violent extremist organizations (VEO) successfully use social media to recruit, train, fundraise, and command and control on-the-ground military operations. Anecdotal success stories gleaned from Twitter or other media is insufficient, especially when repeatable, systematic approaches for exploiting this environment are absent. This tool will be integrated into CTTSO's Conflict Zone Tool Kit (CZTK) and will set the foundation for military planners and senior leaders to visualize and understand key terrain in online social networks. Complete an effort that will address a gap in understanding the strategy and concepts of how to foster effective Counter Unconventional Warfare (UW) in the modern age. This effort will explore and inform strategy and concepts focused on how a country prepares itself to conduct resistance against an occupying aggressor and what measures and actions a country can take prior to occupation. This effort will provide an opportunity to gain insight into the phenomenon of resistance and modern counter UW by looking through the lens of current events in Ukraine. It will draw lessons from the historical cases and, where appropriate, will derive comparisons with current events in the Ukraine. A key element will be to understand variables that lead to failure in the former Soviet Republics or other select regions.			
Title: PERSONNEL PROTECTION	8.986	15.150	8.552

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Description: The Personnel Protection Subgroup's objective is to develop new equipment, reference tools, and standards to improve the protection of personnel. Projects focus on putting innovative tools such as automated information management systems, communication devices, tagging, tracking and locating devices, mobile surveillance systems, as well as personal and vehicle protection equipment in the hands of personnel.

FY 2015 Accomplishments:

Completed development and deployed a capability that activates vehicle tracking, tagging, and locating device upon detection of a blast. Completed development and delivered a whole body deformation tool and analysis for the development of protective solutions for vehicles, ships, and buildings. Completed development of a three dimensional personnel tracking and locating system for use within structures. Completed development of a capability for local data storage of maps for operational use in austere environments. Completed development of a mobile blast mitigation barrier that mitigates fragmentation effects of a behind the wall improvised explosive device. Continued development of a tethered aerial platform for enhanced situational awareness and communication capabilities. Continued development of a concealable armor system that provides rifle threat protection. Continued development of a novel lightweight armor material that provides rifle protection. Continued development of automated exploitation algorithms for light detection and ranging data. Continued development of biomarker identification for brain injury using magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) to monitor neurochemical biomarkers for post-traumatic stress disorder and mild traumatic brain injury. Initiated development of counter unmanned aerial vehicle capabilities. Initiated development of a multi radio device that combines multiple radios, GSM and Iridium communication capabilities into one device. Initiated development of a wireless tactical communications headset. Initiated development of a miniaturized transmitter device that can accommodate a Tier 1 unmanned aerial vehicle (UAV) to transmit the UAV video feed over the cellular network for enhanced situational awareness. Initiated development of a novel material for ballistic and blast protection that utilizes fiber optics to enable visibility with opaque armor. Initiated development of a statistical correlation of environmental, storage, duty, and geographic region parameters on the degradation and life cycle of body armor. Initiated characterization of ballistic clay to understand unconstrained boundary effects of built up regions of ballistic clay backing in armor testing.

FY 2016 Plans:

Complete development of a tethered aerial platform for enhanced situational awareness and communication capabilities. Complete development of a concealable armor system that provides rifle threat protection. Complete development of a novel lightweight armor material that provides rifle protection. Complete development of automated exploitation algorithms for light detection and ranging data. Complete development of biomarker identification for brain injury using magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS) to monitor neurochemical biomarkers for post-traumatic stress disorder and mild traumatic brain injury. Complete development of counter unmanned aerial vehicle capabilities. Complete development of a multi radio device that combines multiple radios, GSM and Iridium communication capabilities into one device. Complete

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
development of a wireless tactical communications headset. Complete development of a miniaturized transmitter device that can accommodate a Tier 1 unmanned aerial vehicle (UAV) to transmit the UAV video feed over the cellular network for enhanced situational awareness. Complete development of a novel material for ballistic and blast protection that utilizes fiber optics to enable visibility with opaque armor. Complete development of a statistical correlation of environmental, storage, duty, and geographic region parameters on the degradation and life cycle of body armor. Complete characterization of ballistic clay to understand unconstrained boundary effects of built up regions of ballistic clay backing in armor testing. Initiate development of a mechanism to wirelessly charge onboard power supplies for in-flight sUASs. Initiate development of an event pin detection system to mitigate the risk of adversaries, including insider threats, gaining unauthorized access to event sites. Initiate development of an enhanced vehicle tracking system to operate in urban and GPS denied areas. Initiate development of a multifunctional head protection system that provides ballistic protection, and incorporates communication and data display capabilities. Initiate development of an imminent danger notification system that immediately alerts building occupants to a perceived or actual threat. Initiate development of a system that will augment the strength and endurance of the warfighter without degrading speed or mobility. Initiate development of a system to detect and detach magnetically attached explosive devices placed on vehicles. Initiate development of a man packable system that reduces or eliminates the radar, electronic, thermal, infrared, visual or acoustic signatures of a dismounted soldier. ***FY 2017 Plans:*** Complete development of a mechanism to wirelessly charge onboard power supplies for in-flight sUASs. Complete development of an event pin detection system to mitigate the risk of adversaries, including insider threats, gaining unauthorized access to event sites. Complete development of an enhanced vehicle tracking system to operate in urban and GPS denied areas. Continue development of a multifunctional head protection system that provides ballistic protection, and incorporates communication and data display capabilities. Continue development of an imminent danger notification system that immediately alerts building occupants to a perceived or actual threat. Continue development of a system that will augment the strength and endurance of the warfighter without degrading speed or mobility. Continue development of a system to detect and detach magnetically attached explosive devices placed on vehicles. Continue development of a man packable system that reduces or eliminates the radar, electronic, thermal, infrared, visual or acoustic signatures of a dismounted soldier.			
Title: PHYSICAL SECURITY ***Description:*** Rapidly develop and transition physical security/force protection capabilities and technologies to support forward deployed and domestic first responders, military, interagency, and international partners in the focus areas of Blast Effects and Mitigation; Emerging Explosive Threats; Vulnerability Identification; Integrated Solutions; and, Screening, Surveillance; and Detection. Emphasize these technology development efforts primarily at U.S. embassies and consulates, forward operating bases, along the U.S. borders, at mass transportation and commerce nodes, in maritime port and littoral environments, and in support of large scale public venues.	12.850	48.320	7.155

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: Completed development of a fast-running, CHINOOK-based computational tool to assist Federal and municipal planners and first responder personnel in predictive blast analysis in an urban environment. Completed development of explosive testing methodology to reinforce critical infrastructure design for mitigated and unmitigated brick tunnels. Completed development of an IR-based detection system with automatic focus to allow for enhanced detection of explosive and weapon threats in operational environments. Completed the development and assessment of the Military Blast Expert Evaluation Software to aid commanders in protecting US military expeditionary bases globally. Continued development of a modular air-droppable force protection kit that includes mini-radar, trip wire sensor and electro-optical/IR camera sensor. Continued development of a tool for an understanding of TNT equivalency that will provide operational forces necessary information for protecting personnel and infrastructure. Continued development of forced-entry, ballistic and blast resistant doors to support US facilities abroad. Continued development of an automatic target recognition and improved gimbal control, to maneuver in rough terrain, for on-the-move, standoff IED detection. Continued development of a rapidly deployable, temporary antipersonnel barrier system to protect fixed and expeditionary facilities in response to increased threat levels. Continued development of tactical arresting systems designed to stop vehicles over a short distance. Continued development of an Advanced Diver Data Display System final prototype for combat swimmers. Continued development of an advanced active diver thermal protection system for long exposure dives, including SEAL Delivery Vehicle (SDV) operations. Continued development and upgrade of a tactical compact aerostat surveillance system for intelligence, surveillance and reconnaissance, as well as communication between non-line-of-sight (NLOS) forces. Initiated development of a system that can determine the path of a long underground conductor, given a known end of the conductor. Initiated development of decision aids for first responders and military engineers by testing explosives effects in an urban environment, to include Historic Masonry and frangible front structures. Initiated development of an in-tunnel unmanned aerial vehicle (UAV) that will provide the ability to safely conduct reconnaissance of discovered illicit tunnels and/or scheduled inspections of underground municipal infrastructures (UMIs) for evidence of interconnecting tunnel activity. Initiated development of a high performance towed sled to provide increased payload and deployment options for existing combatant craft used by Naval Special Warfare (NSW). Initiated development of computer modeling and simulation program to determine the smallest booster size needed to initiate detonation of Ammonium Nitrate Prill in shipping configuration to determine screening and detection capability needed to prevent the weaponization of fertilizer being transported in public areas. Initiated development of materials and mechanisms for tactical delivery of novel non-lethal solutions for maritime vessel disablement. Initiated development of U.S. Navy life cycle cost benefit analysis by conducting intermediate system integration and environmental testing of the HALO Maritime Barrier System. Initiated development of a mobile application to enhance and host the Vehicle Explosion Analysis Software. Initiated and Completed tests to explore the feasibility of use and characteristics of the emerging explosive threat of cast Erythritol Tetranitrate (ETN). Initiated Joint work between U.S. and Australia to test, characterize and model a novel propane tank Vehicle Borne Improvised Explosive Device (VBIED) threat. Initiated development of a portable and ruggedized body scanner for personnel protection missions based on the existing AIT stationary body scanner system			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
developed by Tek84. Initiated development of two distinct versions of preliminary tunnel mapping system demonstrators that leverage research and technology developed under a previous task. Initiated development of a subterranean communications system that is man portable and will give operators the ability to effectively communicate within a tunnel. Initiated development of a small, lightweight, parachute-balloon based, tethered tunnel scanning system which will be able to maneuver inside tunnels and provide ISR to operators on surface via real time video transmission. Initiated joint test and evaluation of the IDAN kit, a portable system that can be used to quickly block tunnel entrances/exits as well as doorways in underground tunnels. Initiated development of a bi-static electromagnetic cavity countermeasure prototype for detection of existing tunnels (voids) and existing tunnels containing conductive infrastructure. Initiated development of a joint multi-disciplinary geophysical survey kit, comprised of two distinct classified tools. Initiated preliminary development of a test site to evaluate and optimize advanced geophysical survey capabilities for use in terrains and geologies of particular interest to the US and Israel. Initiated development of an airborne variant of the T-track system, to determine the path of a long underground conductor, given a known end of the conductor, at low altitudes.			
FY 2016 Plans: Complete development of a modular air-droppable force protection kit that includes mini-radar, trip wire sensor and electro-optical/IR camera sensor. Complete development of a software tool for an understanding of TNT equivalency that will provide operational forces necessary information for protecting personnel and infrastructure. Complete development of forced-entry, ballistic and blast resistant doors to support US facilities abroad. Complete development of an automatic target recognition and improved gimbal control, to maneuver in rough terrain, for on-the-move, standoff IED detection. Complete development of a rapidly deployable, temporary barrier system to protect fixed and expeditionary facilities in response to increased threat levels. Complete development of tactical arresting systems designed to stop vehicles over a short distance. Complete development of an Advanced Diver Data Display System final prototype for combat swimmers. Complete development of an advanced active diver thermal protection system for long exposure dives, including SEAL Delivery Vehicle (SDV) operations. Complete development and upgrade of a tactical compact aerostat surveillance system for intelligence, surveillance and reconnaissance, as well as communication between non-line-of-sight (NLOS) forces. Continue development of decision aids for first responders and military engineers by testing explosives effects in an urban environment, to include Historic Masonry and frangible front structures. Continue development of an in-tunnel unmanned aerial vehicle (UAV) that will provide the ability to safely conduct reconnaissance of discovered illicit tunnels and/or scheduled inspections of underground municipal infrastructures (UMIs) for evidence of interconnecting tunnel activity. Initiate development of a fast-running ultra-high performance concrete slab model, WAC-U, and improve tools for design, protective use, and vulnerability assessments. Complete development of a high performance towed sled to provide increased payload and deployment options for existing combatant craft used by Naval Special Warfare (NSW). Initiate development of a surveillance system with automated 360-degree long range scanning capability (optical radar) to protect the Force in Tactical Combat Outposts. Continue development of computer modeling and simulation program to determine the smallest booster size needed to initiate detonation of Ammonium Nitrate Prill in shipping configuration to determine			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
screening and detection capability needed to prevent the weaponization of fertilizer being transported in public areas. Continue development of materials and mechanisms for tactical delivery of novel non-lethal solutions for maritime vessel disablement. Complete development of US Navy life cycle cost benefit analysis in support of POM decision by conducting intermediate system integration and environmental testing of the HALO Maritime Barrier System. Complete development of a mobile application to enhance and host the Vehicle Explosion Analysis Software. Initiate development of a set of guidelines and certifications that can be used by public, private, academic, and government entities to support the qualification of engineers and architects capable of characterizing and mitigating explosive effects. Complete testing on localized responses from facades to quantify the effects of responding components on blast propagation through a new series of controlled explosive tests at the Urban Canyon Test facility. Complete Joint work between U.S. and Australia to test, characterize and model a novel propane tank Vehicle Borne Improvised Explosive Device (VBIED) threat. Continue development of a portable and ruggedized body scanner for personnel protection missions based on the existing AIT stationary body scanner system developed by Tek84. In accordance with Congressional direction to work with Israel to counter tunnel threats, PS will complete development of two distinct versions of preliminary tunnel mapping system demonstrators that leverage research and technology developed under a previous task. Complete development of a system that can determine the path of a long underground conductor, given a known end of the conductor. Continue development of a subterranean communications system that is man portable and will give operators the ability to effectively communicate within a tunnel. Continue development of a small, lightweight, parachute-balloon based, tethered tunnel scanning system which will be able to maneuver inside tunnels and provide ISR to operators on surface via real time video transmission. Complete joint test and evaluation of the IDAN kit, a portable system that can be used to quickly block tunnel entrances/exits as well as doorways in underground tunnels. Continue development of a bi-static electromagnetic cavity countermeasure prototype for detection of existing tunnels (voids) and existing tunnels containing conductive infrastructure. Continue development of a joint multi-disciplinary geophysical survey kit, comprised of two distinct classified tools. Complete preliminary development of a test site to evaluate and optimize advanced geophysical survey capabilities for use in terrains and geologies of particular interest to the US and Israel. Complete development of an airborne variant of the T-track system, to determine the path of a long underground conductor, given a known end of the conductor, at low altitudes. Initiate development of a mobile system for stand-off detection and mapping of specified geophysical phenomena using technology developed under previous bilateral tasks. Initiate development and integration of an extended coverage system for novel border protection applications and test and evaluate the integrated system in different terrain/geophysical conditions. Initiate adaptation of commercial drilling capabilities and techniques for novel military and homeland defense applications. Initiate development of a fast drilling capability for use under combat conditions in various terrains. Initiate adaptation of existing sensors to detect underground geophysical phenomena from the surface. Initiate test and evaluation of borehole antennas for geophysical survey applications to determine capability for subsurface profiling and object detection.			
FY 2017 Plans:			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Continue development of decision aids for first responders and military engineers by testing explosives effects in an urban environment, to include Historic Masonry and frangible front structures. Complete development of an in-tunnel unmanned aerial vehicle (UAV) that will provide the ability to safely conduct reconnaissance of discovered illicit tunnels and/or scheduled inspections of underground municipal infrastructures (UMIs) for evidence of interconnecting tunnel activity. Complete development of a fast-running ultra-high performance concrete slab model, WAC-U, and improve tools for design, protective use, and vulnerability assessments. Complete development of a surveillance system with automated 360-degree long range scanning capability (optical radar) to protect the Force in Tactical Combat Outposts. Complete development of computer modeling and simulation program to determine the smallest booster size needed to initiate detonation of Ammonium Nitrate Prill in shipping configuration to determine screening and detection capability needed to prevent the weaponization of fertilizer being transported in public areas. Complete development of materials and mechanisms for tactical delivery of novel non-lethal solutions for maritime vessel disablement. Complete development of a portable and ruggedized body scanner for personnel protection missions based on the existing AIT stationary body scanner system developed by Tek84. Complete development of a subterranean communications system that is man portable and will give operators the ability to effectively communicate within a tunnel. Complete development of a small, lightweight, parachute-balloon based, tethered tunnel scanning system which will be able to maneuver inside tunnels and provide ISR to operators on surface via real time video transmission. Complete development of a bi-static electromagnetic cavity countermeasure prototype for detection of existing tunnels (voids) and existing tunnels containing conductive infrastructure. Complete development of a joint multi-disciplinary geophysical survey kit, comprised of two distinct classified tools. Continue development of a set of guidelines and certifications that can be used by public, private, academic, and government entities to support the qualification of engineers and architects capable of characterizing and mitigating explosive effects. Continue development of a mobile system for stand-off detection and mapping of specified geophysical phenomena using technology developed under previous bilateral tasks. Continue development and integration of an extended coverage system for novel border protection applications and test and evaluate the integrated system in different terrain/geophysical conditions. Continue adaptation of commercial drilling capabilities and techniques for novel military and homeland defense applications. Continue development of a fast drilling capability for use under combat conditions in various terrains. Continue adaptation of existing sensors to detect underground geophysical phenomena from the surface. Continue test and evaluation of borehole antennas for geophysical survey applications to determine capability for subsurface profiling and object detection.			
Title: SURVEILLANCE, COLLECTION AND OPERATIONS SUPPORT	19.068	17.034	10.651
Description: Identify high-priority user requirements and special technology initiatives focused primarily on countering terrorism through offensive operations. Enhance US intelligence capabilities to conduct retaliatory or preemptive operations and reduce the capabilities and support available to terrorists.			
FY 2015 Accomplishments:			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Completed a capability to manage and protect privacy and personal information from ISIL operatives to include social networks and public databases. Continued development and testing of standardized canine explosive scent training kits to assist personnel that combat ISIL. Continued development of Unmanned Aerial Vehicles to reduce payloads for effective and efficient communication relays to counter ISIL. Continued development of multimedia exploitation human language technology tools for required new languages and for insertion into operational settings to better combat ISIL. Initiated the development of customized force tracking capabilities to combat ISIL into existing fielded technologies. Initiated the integration of public databases into a single user interface application to protect privacy and personal information from ISIL operatives. Initiated development of enhanced technology to assist analysts with biometric intelligence and reporting on ISIL personnel. Initiated deployment of field technical surveillance capabilities against ISIL and enhance custom force tagging, tracking and locating capabilities. Initiated the development of a software application capable of collecting performance and biographical data for selection and assignment of military personnel, complex modeling, and demand forecasting to assign the appropriate personnel to combat ISIL.			
FY 2016 Plans: Complete development and testing of standardized canine explosive scent training kits to assist personnel that combat ISIL. Continue development of Unmanned Aerial Vehicles to reduce payloads for effective and efficient communication relays to counter ISIL. Complete development of multimedia, exploitation human language technology tools for required languages and for insertion into operational settings to better combat ISIL. Complete development of customized force tracking capabilities to combat ISIL into existing fielded technologies and transition existing systems and tools. Continue to integrate public databases into a single user interface application to protect privacy and personal information from ISIL operatives. Complete development of enhanced technology to assist analysts with biometric intelligence and reporting on ISIL personnel. Initiate the development of enhanced capabilities to facilitate Computer Network Operations against ISIL. Continue deployment of field technical surveillance capabilities against ISIL and enhance custom force tagging, tracking and locating capabilities. Complete the development of a software application capable of collecting performance and biographical data for selection and assignment of military personnel, complex modeling, and demand forecasting to assign the appropriate personnel to combat ISIL. Initiate the development of convergence solutions to support sustained operations by deployed elements combating ISIL through enhanced layered capabilities.			
FY 2017 Plans: Complete development of Unmanned Aerial Vehicles to reduce payloads for effective and efficient communication relays to counter ISIL. Initiate new capabilities focused on Human Language Technology and multimedia exploitation in critical languages for operational use against ISIL at the strategic and tactical levels. Complete the integration of public databases into a single user interface application to protect privacy and personal information from ISIL operatives. Continue development of enhanced capabilities to facilitate Computer Network Operations against ISIL. Continue deployment of field technical surveillance capabilities			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
against ISIL and enhance custom force tagging, tracking and locating capabilities. Continue the development of convergence solutions to support sustained operations by deployed elements combating ISIL through enhanced layered capabilities.			
Title: TACTICAL OPERATIONS SUPPORT	16.134	16.350	10.353
Description: The Tactical Operations Support subgroup's mission is to execute rapid research and development projects that enhance capabilities of DoD and Interagency special operations tactical teams engaged in finding, fixing, and finishing terrorists. This includes support to state and local law enforcement agencies to combat domestic terrorism. The development focus is enabling small tactical units of dominance by providing state of the art overmatch capabilities in: Offensive Systems; Unconventional Warfare, Counter-Insurgency Support; Tactical Communications; Tactical Reconnaissance, Surveillance, and Target Acquisition Systems (T-RSTA); Specialized Infiltration, Access and Exfiltration Systems; Survivability Systems. ***FY 2015 Accomplishments:*** Completed development and delivery of a next generation tactical mesh network system that provides a self-healing, ad hoc mesh network for the transmission of real-time communications (voice and data) utilizing an Android and Windows application. Completed development and delivery of a 20 pound micro tactical ground robot capable of negotiating rugged terrain and climbing obstacles in complex urban and subterranean environments to obtain visual and acoustic surveillance and reconnaissance to defeat improvised explosive devices. Completed development and delivery of a remotely controlled tactical robotics platform capable of casualty evacuation (CASEVAC), emergency resupply, counter – improvised explosive device (C-IED), and chemical, biological, radiological, nuclear, and explosive (CBRNE) tasks. Completed development and delivery of a single man-portable, collapsible-wing tactical small unmanned aerial system with a secure mobile ad-hoc mesh radio network data-link that is capable of being assembled and hand-launched in less than 60 seconds. Completed development and delivery of an enhanced mobile mortar targeting system mounted on a non-standard vehicle with an integrated Fire Control System that provides extremely rapid and highly accurate indirect fire solutions using legacy 81mm mortar ammunition. Completed development and delivery of program of instruction advanced training and kit to Special Operations Forces (SOF) and select interagency tactical operations snipers to increase first round hit capability, decrease time in the kill chain, and improve long range target interdiction of multiple targets at varying ranges, with an increased maximum effective range of 1,800 meters. Completed development and delivery of a small, weapon rail mounted, un-cooled long wave infrared detector system to provide snipers with an advanced high resolution thermal imagery to conduct target interdiction operations effectively and efficiently at distances out to 1,800 meters. Completed development and delivery of a Special Operation Forces (SOF) advanced ballistic engine and rangefinder capability to increase first round hit capability and provide for ease-of-use shot correction information for warfighters. Continued development and delivery of a tactical tethered aerial ISR capability via an indigenous, non-standard mobility platform that provides austere locations with rapid and improved organic situational awareness. Completed development and delivery of an online and social media awareness video for DOD and Interagency family members to educate on current threats and mitigate vulnerabilities. Completed development and delivery of a cyber-advanced support operations course focused on training tactical operators to			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603122D8Z / *Combating Terrorism Technology Support*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
screen social media with mis-attribution for operational preparation of the environment and force protection. Completed feasibility and terminated a candidate tactical platform marking kit capable of discretely tagging stationary and moving targets for tracking with legacy night vision devices. Completed development and delivery of an extremely low volume, low profile, concealable GPS logger. Completed development and delivery of an ultra-light weight, fast deployable, extremely ruggedized hand-carried unmanned ground system. Completed development and delivery of a mobile mesh network repeater system to expand the capabilities of the micro tactical ground robot system in subterranean environments. Completed development and delivery of a an export variant capability that integrates a commercial grade encryption, wireless mobile mesh ad-hoc network, Android green and blue force tracking, and video teleconferencing, with integrated devices for situational awareness in real-time. Continued development of a sniper ballistic and downwind sensor system to increase first round hit capability. Continued development of an acoustic tooth communicator system for low-visibility operations. Continued development of a high-definition aerial Intelligence, Surveillance, and Reconnaissance (ISR) gimbal payload for specified air platforms that will significantly upgrade situational awareness and intelligence through higher fidelity imaging capabilities. Continued development of a man-portable aerial radar system that can detect unmanned aerial vehicles and ultralights at the tactical edge. Continued effort on an air mobility vehicle analysis of alternatives initiative to conduct training and an operational feasibility assessment for unconventional warfare. Continued development of a portable tactical micro marker system to enhance personnel recovery operations. Continued a test and evaluation of a new ground mobility vehicle for Special Operations Forces (SOF) that increases survivability and provides signature reduction. Continued development of an underwater vision enhancement device for ship hull inspections in turbid water and for maritime to land operations. Continued development of a multispectral augmented visually enhanced reality imaging capability that provides a significant advantage for long range target acquisition in challenging environments. Continued development of a maritime canister launched small unmanned aerial system for amphibious and maritime operations requiring overhead aerial ISR capabilities. Initiated development of a next generation small arms signature reduction suppressors for the MK18 CQBR and M4. Initiated development of a lightweight intermediate caliber cartridge utilizing polymer material technologies to reduce combat load and enhance terminal ballistics. Initiated development of a 5.56mm polymer round to reduce weight for standard issue rounds, enhancing combat effectiveness and reducing warfighter operational load and cost. Initiated development of an enhanced military free fall navigation board that incorporates Android applications for greater command and control and mission planning/execution. Initiated development of microSD chips that provide state-of-the-art high computing at very low power that can create dual personas, enabling secure communication on a smartphone device. Initiated development of a man-portable optical camera system capable of being deployed in complex urban confined spaces, traversing 90 degree corners and obstacles to provide high fidelity situational awareness to law enforcement and SOF tactical teams. Initiated development of a non-pyrotechnic diversionary device that will mitigate collateral damage in confined spaces. Initiated development of a Multi-Role Thermal Survivability System (MRTSS) to support tactical operators conducting aviation, ground mobility, and first responder combating terrorism (CbT) missions. Initiated development and evaluation of a social media analysis tool for tactical operators. Initiated development of a system that attaches to a smartphone that enables tactical operators to measure areas rapidly to gain a 3D model. Initiated development of a lethal miniature aerial munition system (LMAMS) with substantially improved			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
maneuverability, attack angle, loiter time, and lethality with a full mission profile flight training variant. Initiated development and delivery of an unclassified, open source digital operations technical course tailored to train tactical operators in a digital dojo environment to understand the cyber domain and to identify and mitigate cyber threats. Initiated development and delivery of a tactical level training course that teaches enhanced operational preparation of the environment and force protection within the digital social media publically accessible information domain to execute 21st Century Special Warfare mission sets. Initiated development of a next-generation small unmanned aircraft system stabilized gimbal that integrates laser target designation technologies.			
FY 2016 Plans: Complete development and delivery of a sniper ballistic and downwind sensor system to increase first round hit capability. Complete development and delivery of an acoustic tooth communicator system for low-visibility operations. Complete development and delivery of a high-definition aerial Intelligence, Surveillance, and Reconnaissance (ISR) gimbal payload for specified air platforms that will enhance situational awareness and intelligence through higher fidelity imaging capabilities. Complete development and delivery of a man-portable aerial radar system that can detect unmanned aerial vehicles and ultralights at the tactical edge. Complete development and delivery of a tactical tethered aerial ISR capability via an indigenous, non-standard mobility platform that provides austere locations with rapid and improved organic situational awareness. Complete and deliver an air mobility vehicle analysis of alternatives and demonstration initiative to conduct training and an operational feasibility assessment for unconventional warfare. Complete development and delivery of a portable tactical micro marker system to enhance personnel recovery operations. Complete a test and evaluation of a new ground mobility vehicle for Special Operations Forces (SOF) that increases survivability and provides signature reduction. Complete development and delivery of an underwater vision enhancement device for ship hull inspections in turbid water and for maritime to land operations. Complete development and delivery of a mobile mesh network repeater system to expand the capabilities of the micro tactical ground robot system in subterranean environments. Continue development of a multispectral augmented visually enhanced reality imaging capability that provides a significant advantage for long range target acquisition in challenging environments. Continue development of a maritime canister launched small unmanned aerial system for amphibious and maritime operations requiring overhead aerial ISR capabilities. Complete development and delivery of a next generation small arms signature reduction suppressors for the MK18 CQBR and M4. Complete development and delivery of a lightweight intermediate caliber cartridge utilizing polymer material technologies to reduce combat load and enhance terminal ballistics. Complete development and delivery of a 5.56mm polymer round to reduce weight for standard issue rounds, enhancing combat effectiveness and reducing warfighter operational load and cost. Complete development and delivery of an enhanced military free fall navigation board that incorporates Android applications for greater command and control and mission planning/execution. Complete development and delivery of microSD chips that provide state-of-the-art high computing at very low power that can create dual personas, enabling secure communication on a smartphone device. Complete development and delivery of a man-portable optical camera system capable of being deployed in complex urban confined spaces, traversing 90 degree corners and obstacles to provide			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
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Title: TRAINING TECHNOLOGY DEVELOPMENT	10.183	7.900	6.161
Description: The TTD Subgroup's objective is to provide SOF, DoD, and the interagency community with agile, rapid response, R&D capabilities for optimizing performance in the operational environment and increasing readiness for tomorrow's threats. To meet this objective, the subgroup develops human centered technologies that are performance outcome focused in the areas of mobile learning solutions; human performance tools and techniques; immersive and adaptive learning environments; and advanced education and technical skill enhancement methods. TTD's innovative training capabilities are implemented globally to prepare for critical missions in any operational environment to identify, disrupt, and defeat terrorist threats. ***FY 2015 Accomplishments:*** Completed development and implementation of interactive, three-dimensional (3D) animated training scenarios depicting Improvised Explosive Device threats to enhance situational awareness and decision-making for novice and experienced certified public safety responders, federal, and military personnel. Completed two course iterations for training maritime low visibility operations skillsets for personnel to illuminate IED networks. Completed development and evaluation of a system of systems that integrates psychological and behavioral information and technology to predict and optimize human physical performance. Completed development and validation of a performance support system for computer-based training of Regionally Aligned Forces (RAF) Units with customized content based on real-world socio-cultural data from security and/or stability missions. Completed a training needs analysis on the topic of virtual currency and its ties to terrorist activity. Completed design and development of a one-week instructor-led technical surveillance course, and a computer-based prerequisite course and			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
assessment. Continued development and implementation of a training capability for Explosive Ordnance Disposal (EOD) technicians and first responders that identify safe areas/distances to perform duties with minimal risk of injury from overpressure and blast fragmentation caused by Improvised Explosive Devices (IEDs) and breaching charges. Initiated evaluation of a live fire targetry simulation training system to develop and maintain long range shooting skill sets. Initiated development of low-cost robotic targets that move autonomously on a live-fire training range to enhance marksmanship skills and decision making. Initiated design and development of a training and performance support tool for use on mobile devices in operational environments. Initiated design and development of a suite of augmented reality tools for mobile wearable platforms. Initiated development of 3D software models and a mobile application to train features and functions of SOF-Peculiar weapons. Initiated design, development, and implementation of a multi-week special warfare commercial communications course.			
FY 2016 Plans: Complete development of animated computer models for use in a training capability for Explosive Ordnance Disposal (EOD) technicians and first responders on the topic of safe areas/distances to perform duties with minimal risk of injury from overpressure and blast fragmentation. Complete evaluation of a live fire targetry simulation training system to develop and maintain long range shooting skill sets. Complete development of low-cost robotic targets that move autonomously on a live-fire training range to enhance marksmanship skills and decision making. Complete development and evaluation of a training and performance support tool for use on mobile devices in operational environments. Complete development of a suite of augmented reality tools for mobile wearable platforms. Complete development of software models and a mobile application to train features and functions of SOF-Peculiar weapons. Complete development and implementation of a multi-week special warfare commercial communications course. Complete the evaluation of a reactive shooter course incorporating wearable device human performance measures. Complete final course iteration and technology delivery for training maritime low visibility operations skillsets for personnel to illuminate IED networks. Initiate training development on the topic of virtual currency and its ties to terrorist activity. Initiate design and development of task force officer verification and refresher training for delivery on a mobile device. Initiate the development of a virtual reality training capability for pre-mission tasks associated with AC-130 operations.. Initiate the implementation, evaluation, and refinement of a second generation system designed to enhance visual acuity and improve operational visual task performance.			
FY 2017 Plans: Complete training development on the topic of virtual currency and its ties to terrorist activity. Complete the design and development of Task Force Officer verification and refresher training for delivery on a mobile device.. Complete the development of a virtual reality training capability for pre-mission tasks associated with AC-130 operations. Initiate development of an instructor-led training support package for law enforcement personnel tasked with detecting adversarial surveillance in CONUS locations. Complete the implementation, evaluation, and refinement of a second generation system designed to enhance visual acuity and improve operational visual task performance. Initiate the development, implementation and evaluation of an OCONUS low visibility operations course. Initiate the design and development of training software for officers to accomplish immersive use of			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603122D8Z *I Combating Terrorism Technology Support*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
force decision-making training from a desktop computer or tablet. Initiate the development of a training capability that models critical variables relevant to sniper performance allowing the sniper to make decisions and see the result of those decisions in a simulated environment. Initiate the design and development of Remotely Operated Vehicle (ROV) training simulator incorporating the use of the ROV's cameras sonar and navigation software. Initiate the analysis for and design of a system for snipers to practice sniper skills and receive ballistically accurate feedback in an environment where live fire is not available or feasible. Initiate the analysis for and design of a virtual environment accessible via a PC which provides a 15 city block by 15 city block environment with pervasive, non-player characters to immerse students and instructors into realistic, city-based training scenarios.			
Accomplishments/Planned Programs Subtotals	99.121	148.030	73.002

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	21.128	24.782	19.343	-	19.343	24.387	25.066	25.789	26.315	Continuing	Continuing
P313: *Foreign Comparative Testing*	0.000	21.128	24.782	19.343	-	19.343	24.387	25.066	25.789	26.315	Continuing	Continuing

Note

The Foreign Comparative Testing (FCT) Program Element (PE) 0603133D8Z focuses on Pre-Engineering and Manufacturing Development (Pre-EMD) and Proof of Principle prototypes derived from evaluation of foreign equipment that will provide the U.S. Armed Services, Special Operations Command (SOCOM) and Defense agencies, capabilities to counter emerging threats. FCT's broad reach across our allies and friendly foreign countries enables development of innovative, cost effective, and interoperable solutions for the Department of Defense, Multi-Service and Combatant Command (COCOM) priority requirements. FCT also increases competition, ensuring our personnel have access to the best technology available.

In FY 2015, FCT funding from PE 0605130D8Z was realigned to PE 0603133D8Z for Budget Activity alignment and emphasis on prototyping.

A. Mission Description and Budget Item Justification

The FCT program supports the warfighter by leveraging technologies and equipment developed by allied nations and coalition partners to counter emerging threats, thereby accelerating the DoD acquisition process and lowering development costs. FCT supports Better Buying Power 3.0 by incentivizing the use of prototyping and experimentation in advancing technological solutions to warfighter problems and acts as a hedge against threat developments. FCT enhances interoperability, facilitates international collaboration, increases competition in innovation, and enables more efficient and affordable transition of technologies into acquisition programs of record. Authorized by Title 10, U.S. Code, Section 2350a (g), the FCT program is managed by the Office of Secretary of Defense (OSD) Deputy Assistant Secretary of Defense Emerging Capability & Prototyping (DASD(EC&P)), Comparative Technology Office (CTO). FCT projects are sponsored by the Military Services and USSOCOM. Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements and DoD priorities, a thorough market survey, and an emphasis on transitioning technologies into current or future programs of record.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603133D8Z *I Foreign Comparative Testing*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	22.000	21.782	21.643	-	21.643
Current President's Budget	21.128	24.782	19.343	-	19.343
Total Adjustments	-0.872	3.000	-2.300	-	-2.300
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.363	-			
• Realignment for Higher Priority Programs	-	-	-2.150	-	-2.150
• FY15 Reprog. for Cancelled Account	-0.009	-	-	-	-
• Other Reprogrammings	-0.500	-	-	-	-
• Economic Assumptions	-	-	-0.150	-	-0.150

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603133D8Z / *Foreign Comparative Testing*	Project (Number/Name) P313 / *Foreign Comparative Testing*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P313: *Foreign Comparative Testing*	0.000	21.128	24.782	19.343	-	19.343	24.387	25.066	25.789	26.315	Continuing	Continuing

A. Mission Description and Budget Item Justification

The FCT program supports the warfighter by leveraging technologies and equipment from allied nations and coalition partners to counter emerging threats, thereby accelerating the DoD acquisition process and lowering development costs. FCT supports Better Buying Power 3.0 by incentivizing the use of prototyping and experimentation in advancing technological solutions to warfighter problems and acts as a hedge against threat developments. FCT enhances interoperability, facilitates international collaboration, increases competition in innovation, and enables more efficient and affordable transition of technologies into acquisition programs of record. Authorized by Title 10, U.S. Code, Section 2350a (g), the FCT program is managed by the Office of Secretary of Defense (OSD) Deputy Assistant Secretary of Defense Emerging Capability & Prototyping (DASD(EC&P)), Comparative Technology Office (CTO). FCT projects are sponsored by the DoD Services and USSOCOM. Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements and DoD priorities, a thorough market survey, and an emphasis on transitioning technologies into current or future programs of record.

The FCT program is a catalyst for teaming and other business relationships between foreign and U.S. industries. Many successful FCT projects result in the licensed production of a qualified foreign item in the United States. Other nations recognize the long-term value of such practices for competing in the U.S. Defense market and the resultant strengthening of the "two-way street" in Defense procurement. The result often means the creation of jobs and contributions to local economies throughout the United States. To date, companies from 34 states benefited from FCT projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Lightweight M3A1 Recoilless Rifle (Army)	1.318	0.175	-
Description: The M3 Carl Gustaf 84 millimeter (mm) Recoilless Rifle is a reliable, battle -proven, reusable shoulder fired weapon system first introduced to the Army by FCT in 1991. This M3A1 project will eliminate six pounds (28 percent) from the existing weapon by replacing the existing steel tube with a titanium alloy tube, along with other components (bolt, trigger, venturi, and ancillary parts) without changing the firing procedures, operations or ammunition. Since no operational characteristics will be changed, this low-risk approach will produce a lighter weight 84mm shoulder-fired weapon for less time and cost normally required to test and qualify a new weapon system.			
FY 2015 Accomplishments: Vendor provided the detailed M3A1 qualification test plans and schedule. A Cooperative Research and Development Agreement (CRADA) was coordinated between vendor and government to ensure that Export Licenses can be issued for the transportation of the 13 M3A1 test articles to Aberdeen Proving Ground for testing. The CRADA also provided authorization for vendor and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
the U.S. Government to share test data and design information on the M3A1. Conducted engineering analysis/study, analyzed vendor data, and began technical testing. ***FY 2016 Plans:*** Finalize the Integrated Test Plan/Matrix and rounds required for the Lightweight M3A1 qualification test. Conduct Lightweight M3A1 Fatigue and Burst Test. Program Manager (PM) will provide oversight of the operational /user assessment test. Additionally, the PM will prepare the test reports, decision packet and finalized project close-out report.			
Title: Bionic Soldier Power (Army) ***Description:*** Tests an energy harvesting system that converts soldier's leg movement into 12+ watts of power for the soldier on the move. The power is used to charge the soldier's equipment batteries, thus significantly reducing the weight of batteries carried and the need to swap batteries, while extending mission time in any operational environment. ***FY 2015 Accomplishments:*** Continued testing and making modifications to the prototype energy harvesting system.	1.236	-	-
Title: Photonic Enhancements to the Science and Technology in Electronic Warfare Systems (PHESTES)(Air Force) ***Description:*** Conduct lab and field testing of a photonic Electronic Intelligence receiver and a photonic Electronic Countermeasure System. Photonic based technology offers simultaneous wideband spectrum monitoring from one megahertz to 50 gigahertz in a reduced form factor. Current frequency-scanned systems have latency and performance limitations. Some of these limitations can be overcome by utilizing multiple systems in parallel at the cost of increased size, weight, power, and cost. The ability to simultaneously acquire and characterize threat signatures across such a large swath of the electromagnetic spectrum in a reduced form factor potentially provides a new Electronic Warfare (EW) capability across the DoD. ***FY 2015 Accomplishments:*** The Air Force Research Laboratory Sensors Directorate (AFRL/SN) at Wright Patterson Air Force Base (WPAFB) conducted solicitation and down-select. Developed test plan, received test articles, and conducted a System Readiness Review and a Test Readiness Review prior to initial performance testing at the Naval Research Lab (NRL). ***FY 2016 Plans:*** Complete performance and operational testing at NRL. Transition system to AFRL/SN at WPAFB for performance and operational testing in the Integrated Demonstrations and Applications Laboratory, the anechoic chamber, and the Passive Radio Frequency Outdoor Range. Complete final test report and FCT closeout.	1.585	0.540	-
Title: Field Deployable Whole Blood Collection and Transfusion Set (Air Force)	0.601	0.660	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: The Air Force will test a ruggedized, field-deployable, cost-effective, and mass-producible whole-blood collection and transfusion system that provides leukoreduced, platelet sparing, whole-blood transfusion in austere and far forward settings. The efforts will include modifying the current Food and Drug Administration (FDA) approved/CE marked TerumoBCT Imuflex Whole Blood - Saving Platelet (WB-SP) filter into a WB collection and transfusion kit that improves the current WB collection system and preserves the critical platelet component. The project will test the quality of each blood component under various conditions to ensure applicability to a combat environment. The goal is to produce a qualified product ready for mass production. ***FY 2015 Accomplishments:*** Test planning initiated and test article procurement initiated. ***FY 2016 Plans:*** Conduct Phase I filtration & storage studies. Initiate Phase II prototype design, development, and initiate Phase III military application testing of blood filter kit.			
Title: Gallium Nitride (GaN) Amplifier Performance and Reliability Investigation of Commercial-Off-The-Shelf (APRICOTS) (Air Force) ***Description:*** The GaN APRICOTS project will acquire and test GaN solid-state power amplifiers from a number of foreign vendors with the objectives to investigate cost and performance relative to domestic GaN solid-state power amplifiers. A rigorous, common test methodology will be applied to all test articles to provide for a level-playing-field comparison of the global GaN technology landscape. The goal is to determine the best performing, lowest cost source of GaN solid-state power amplifiers for defense applications. ***FY 2015 Accomplishments:*** Initiated Phase I for test article procurement and test planning. ***FY 2016 Plans:*** Receive test articles and specialized testing equipment. Conduct Phase II benchmark testing. Initiate Phase III robustness testing.	0.935	0.830	-
Title: Mobile Gunnery Live Fire Monitoring System (MGLFMS) (Navy) ***Description:*** The project is testing a Tank and Infantry Fighting Vehicle gunnery training system that wirelessly transmits live audio and video feeds of weapon systems data to a mobile monitoring station. The MGLFMS enables instructors to evaluate crew functions in real-time, make instantaneous corrections, and provides recording capability for detailed after action reviews. Foreign data has shown that training with this system increases probability of gunnery crews placing first round on target. The system provides instructors a tool to evaluate the student's firing solution and improve student's gunnery skills. MGLFMS is currently	1.110	0.594	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
in use by many North Atlantic Treaty Organization countries and supports U.S. Marine Corps Program Manager for Training Systems requirements. ***FY 2015 Accomplishments:*** Initiated the fabrication of Phase I test articles during 1Q FY 2015. Received Phase I test articles during 2Q FY 2015. Completed Phase I technical testing during 2Q–4Q FY 2015. Completed Phase II Critical Design Review; form fit testing and verification with U.S. Marine Corps Assault Amphibious Vehicle; and base equipment testing for each system during 4Q FY 2015. ***FY 2016 Plans:*** Receive Phase II test articles during 4Q FY 2016. Complete Phase II Performance Testing and Field User Evaluation (FUE) during 4Q FY 2016. Initiate Phase III data collection of U.S. Marine Corps Light Armored Vehicle and M1A1 Main Battle Tank during 3Q–4Q FY 2016.			
Title: Automated Target Recognition (ATR) for MK18 Unmanned Underwater Vehicles (UUV) (Navy) ***Description:*** UUV mission planners and adaptive behaviors with ATR functionality are needed to plan/execute UUV missions. Foreign UUV mission planning/post mission analysis software with capability for adaptive behaviors and ATR in an open, service-oriented architecture, will be tested for operational employment to determine if they provide better efficiency and user interfaces than current domestic product. ***FY 2015 Accomplishments:*** Performed ATR software evaluation and made software capability improvement/enhancement recommendations. ***FY 2016 Plans:*** Use prior year funding to: initiate follow-on testing of ATR capability enhancements to software; complete follow-on testing; write test report and provide information/analysis recommendation to procurement decision authority; and close out project.	1.374	0.000	-
Title: Compact Multi-Diver Heating System (Navy) ***Description:*** The SEAL Delivery Vehicle/Shallow Water Combat Submersible (SDV/SWCS) Compact Multi Diver Heating System project seeks to significantly reduce the size and form factor of the SOCOM Multi Diver Heating and Cooling System and to modify it to allow insertion and removal from wet submersibles. This is to provide Navy SEALs operating in very cold water “thermal neutrality” by providing active heating so as to keep divers in thermal balance, improve physical and mental performance, eliminate non-freezing injuries and increase the duration of mission profiles in support of cold water operations. The system is based on vapor compression (Heat Pump) technology and will include enhancements of the vapor compression unit, improve fluid lines to reduce heat loss, and refine liquid circulating garment design and connection fittings to maximize heat transfer efficiency, while ensuring diver agility and comfort.	0.370	0.745	-

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Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: Completed independent design analysis and project order for test article. ***FY 2016 Plans:*** Conduct performance verification of the first prototype and build and test depth-capable Phase II prototype; perform unmanned performance verification for operation at depth at the Hydrospace Lab at Naval Surface Warfare Center, Panama City Division; conduct manned performance tests in a chilled test pool with the system integrated on a Naval Special Warfare wet submersible or representative mockup of the hull form; and, begin construction of up to two production representative systems late FY 2016.			
Title: Enhanced Shipboard Navigation Global Navigation Satellite System (Navy) ***Description:*** This effort will test and evaluate the performance of a multi-constellation Global Navigation Satellite System (GNSS) receiver for U.S. Naval surface ship and airborne applications to provide an additional navigation source to existing military Global Positioning Satellite solutions. This testing will provide valuable insight into the potential benefits of using these signals in a U.S. military environment. Differences in positioning and timing between the foreign GNSS receiver and the platform's principle military Global Positioning System (GPS) receiver may indicate to the platform that it should select an alternate, non-satellite navigation source. ***FY 2015 Accomplishments:*** Initiated test article procurement for a receiver that leverages foreign navigation satellites as a complement to existing military GPS. ***FY 2016 Plans:*** Receive first operational prototype, test basic GNSS functionality in collaboration with U.S. Naval Observatory, and initiate prototype test article and software modifications as required. ***FY 2017 Plans:*** Complete GNSS test equipment modifications; test foreign GNSS receivers as an integrated enhancement to existing navigation systems; and complete final test and close-out reports.	0.530	0.510	0.600
Title: Software Defined Networking (SDN) (Navy) ***Description:*** This project will test commercially available, industry leading, advanced computer network solutions designed with open standards to enhance performance, increase security, and reduce costs for U.S. Navy networks. ***FY 2015 Accomplishments:***	0.620	0.420	0.140

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Received Phase I test articles and conducted initial functionality assessment. ***FY 2016 Plans:*** Complete testing of prototypes; down-select to best SDN monitoring and control technologies; and begin final testing in late FY 2016. ***FY 2017 Plans:*** Complete demonstration of feasibility and benefits of SDN monitoring and control technologies; provide a final demonstration and test report for decision package.			
Title: Hazardous Chemical Exploitation System (United States Special Operations Command (USSOCOM)) ***Description:*** This project will evaluate extraction equipment that can be used to safely and quickly sample hazardous chemicals in ordnances or storage containers. This will allow Special Operations Forces (SOF) teams to develop validated on-site disposal, neutralization and/or transfer protocols in real-world hostile environments. This project compares current U.S. extraction devices with the existing British "tapping tools." ***FY 2015 Accomplishments:*** Procured training munitions, metal containers, chemicals and all related test items. Successfully conducted ancillary support equipment testing and preliminary tool testing of both candidate tools. Verification and validation studies completed. Chemical simulant trials were conducted verifying the effectiveness of existing tactics, techniques and procedures (TTPs). Submitted results from Preliminary Testing. ***FY 2016 Plans:*** Perform Test Readiness Review. Continue advanced tool testing and system validation at Dugway Proving Grounds, Utah to validate TTPs. PM will submit final test report, close-out report; and provide technical data to USSOCOM Acquisition Authority for Milestone C Decision.	1.152	0.428	-
Title: Tactical Wideband High-Frequency (WBHF) Radio Assessment (United States Special Operations Command) ***Description:*** This project evaluates a tactical WBHF radio operational prototype that may provide up to 240 kilo-bytes per second data rates by using modern internet protocol networking. Video and other data intensive services can be supported without satellites through the use of automatic spectral sensing that ensures that the established link not only has the best signal, but also the maximum available bandwidth without any operator intervention. This radio will provide space resilience and can reduce reliance on satellite communications capability. ***FY 2015 Accomplishments:***	1.030	0.275	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Initiated procurement of test articles and vendor support services for Phase I performance assessment. Conducted interoperability and compatibility early user assessments in Ottawa, Canada. Report of Findings delivered to Program Management Office (PMO) and reviewed and completed Phase I. ***FY 2016 Plans:*** Conduct Phase II performance assessment to include finalizing minor modifications and integration of ruggedized subsystems. Conduct bench level interoperability and compatibility testing of prototype and existing U.S. WBHF radios. Submit Final Technical Test Reports to PMO. Conduct Phase III performance testing by performing over-the-air operational testing of Operational Prototype (OP) and U.S. WBHF radios. Provide Milestone B Decision for PMO and complete the FCT close out process/report.			
Title: Low Cost Innovative Projects (Projects Less Than One Million Dollars Each): ***Description:*** OSD CTO selected multiple low cost projects in the areas of Force Protection, Force Support, Anti-Access/Area Denial, Robotics and Autonomous Systems, Interoperability and Countering Unmanned Systems. These projects were selected to deliver proof of principle prototypes for evaluation, assessment and Service adoption within 24 to 36 months. ***FY 2015 Accomplishments:*** - Energy Absorbing Material for Improved Blunt Impact/Trauma Protection: procured helmet suspension test articles and conducted human factors testing for a soft flexible material that stiffens upon impact for use in helmets and body armor to reduce blunt impact forces. - Improved Steels: completed test plan and initiated procurement of test articles of a new class of high nitrogen steels that may improve vehicle protection and durability. - Solar Power Shelter System: procured test articles for this alternative energy source and conducted onsite training at Army Test Center with vendor; prepared the Safety Assessment Report for supporting Army base camps. - Rapid Airfield Damage Assessment Systems: conducted operational testing on a system that detects airfield damage or objects on runways/taxiways that will damage aircraft during takeoff or landing. - Pilot Physiological Monitoring: procured and began testing a flight helmet with integrated sensors that monitor heart rate, blood oxygen saturation, eye metrics, and electrical activity in the brain and warns pilot of out-of-bounds physiological conditions that could compromise performance and adversely affect the mission. - Multifunctional Information Distribution System Joint Tactical Radio System Radio (MIDS-JTRS) Frequency Amplifier (RFA): finalized Government First Article Qualification Testing procedures; completed environmental testing; and performed testing of the Communication RFA Shop Replaceable Unit. - Seismic Detection System Video Augmentation: completed follow-on testing of a video streaming system that compresses full motion video for transfer over bandwidth constrained wireless communications. Streaming video is triggered by a seismic sensor providing visual verification of suspicious activity such as Improvised Explosive Device (IED) emplacement.	9.267	7.605	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Computer Network Defense (CND) Advanced Persistent Threat (APT) Detection: conducted initial testing and finalize comprehensive test plan for evaluation of software that will address advanced persistent threats (APTs). - H-1 Crash-resistant, Ballistic-tolerant, Fuel Cell Qualification: test article procured; received Phase I test articles. - Horizon Reference System Electroluminescent Panel Replacement: performed testing and provided evaluation reports for a systematic upgrade to modernize the existing electroluminescent (EL) Panel Bar to Light Emitting Diode (LED) Technology on the shipboard Horizon Reference Set. - Thermal Insulation Coating: contracted for ceramic based paint samples that provide thermal protection and insulation on USMC composite shelters. - Polar Icebreaker Study: continued conducting a study of icebreaker hull-form and propulsion technology that will inform future Navy and Coast Guard ship hull design requirements. - Small Unmanned Aerial Vehicle (UAV) Payload with Laser Designator: began evaluation of an Electro-optical/Infrared/Laser Designator payload for Navy's RQ-21A tactical UAV. - Electronic Underwater Navigation System: received test articles, conducted safety and technical testing for a hand-held, precise, navigation device that guides submerged combat divers to their intended target. - "Out-of-Band" Multi-Mission Night Vision Goggles: completed qualification testing of tubes which will be retrofitted into night-vision goggles which will provide greater situational awareness, improved fire control, and better capability against camouflaged targets.			
FY 2016 Plans: - Solar Power Shelter System: conduct engineering analysis/study, conduct technical testing, perform operator/user assessment test, write test reports, prepare decision packet and close out report. - Improved Steels: conduct engineering analysis/study of materials (failure mode, durability and toughness), conduct technical testing (ballistic, weld testing and corrosion resistance), write test reports, revise military specification for protection plates and close out report. - Pilot Physiological Monitoring and Warning System: Conduct Phase II helmet stability and sensor suite signal stability testing, evaluate blood flow sensors, and evaluate arterial and cerebral blood oxygen saturation sensor accuracy during hypoxia exposure to simulated altitude of 25,000 feet in an altitude chamber. Compare data to F-22 validated arterial and cerebral oxygen measurement systems data. Conduct Phase III testing in the centrifuge test facility (San Antonio, TX), conduct altitude chamber testing in the man-rated research altitude chamber test facility (San Antonio, TX) to examine functionality in a reduced barometric pressure environment; and provide all data to USAF for decision if system should continue into flight testing. - MIDS-JTRS Radio Frequency Amplifier: complete testing and analysis; complete decision packet; write final test and close-out reports. - Computer Network Defense Advanced Persistent Threat Detection: finish test and evaluation; complete operator/user test reports; complete decision packet and close-out report.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603133D8Z / *Foreign Comparative Testing*	**Project (Number/Name)** P313 / *Foreign Comparative Testing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- H-1 Crash-Resistant Ballistic Tolerant Fuel Cell Qualification: Phase I testing; receive Phase II test articles and begin testing and qualification of fuel cell. - Small Unmanned Aerial Vehicle (UAV) Payload with Laser Designator: conduct integrated flight test on Unmanned Air System at the WOLF Laser Test Range, Webster Field, Maryland mid-FY 2016; follow up with laser designation demonstration in support of USMC AH-1Z attack helicopter late FY 2016 with procurement decision by end of fiscal year. - Thermal Insulation Coating: complete technical testing of coating; and complete test and close-out reports.			
Title: Asymmetric Force Application and Autonomous Systems Focus Areas	-	5.650	6.451
Description: FCT will invest in cross-domain, innovative, non-traditional technologies for new and emerging capabilities from international partners to enable cost-leveraging, increase competition, and provide more efficient solutions for our forces during maneuver and engagement operations. Solutions will reduce U.S. reliance on overleveraged blue capabilities and creatively exploit increasingly capable adversary systems while adjusting the cost curve in our favor. Applications of particular interest are those able to provide an innovative technology offset and/or cost calculus advantage. Our allies have made particular progress in the development of systems that offer a significant cost advantage in procurement or operation and reduce the amount of manpower necessary to effectively conduct operations. In addition, FCT will continue to seek out increased interoperability across platforms and systems. These technologies will be likely candidates for evaluation under the FCT program. ***FY 2016 Plans:*** During FY 2016, FCT will focus on selecting projects supporting the below Asymmetric Force Application and Autonomous System Areas: - Technologies to counter threats associated with integrated air defense systems - Technologies that enhance the ability to conduct long range penetrating strike - Offensive and defensive air superiority operations - Mobile unmanned systems that must maneuver in an environment with little or no human assistance - Systems that aid human cognitive tasks ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Asymmetric Force Application and Autonomous System Areas: - Technologies to counter threats associated with integrated air defense systems - Technologies that enhance the ability to conduct long range penetrating strike - Offensive and defensive air superiority operations - Mobile unmanned systems that must maneuver in an environment with little or no human assistance			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Systems that aid human cognitive tasks			
Title: Space Resilience and Spectrum Agility Focus Areas	-	3.200	6.701
Description: FCT will invest in cross-domain, innovative Space Resilience and Electromagnetic Spectrum Agility evaluations of new and emerging capabilities with international partners. Solutions will increase U.S. options in responding to sophisticated attempts to deny U.S. access to space-based capabilities and allow the Department of Defense to operate with freedom of maneuver in the electromagnetic spectrum. ***FY 2016 Plans:*** During FY 2016, FCT will focus on selecting projects supporting the below Space Resilience and Electromagnetic Spectrum Agility Areas: - Taking proactive and reactive defensive measures (Avoidance), designing systems with enhanced survivability features (Robustness), conducting operations to replenish lost or diminished capacity (Reconstitution) and help re-establish space capability and capacity (Recovery) - Enhancing subsystems and exploring activities that support any systems architecture able to achieve effects normally associated with current space systems - Gaining and attaining access to spectrum for friendly forces, denying and/or degrading spectrum to our adversaries - Conducting Electromagnetic (EM) deception operations to degrade an adversary's understanding of our intent and capability - Preventing the adversary from leveraging the EM domain to conduct operations in other domains (i.e., air, space, maritime, land and cyber) - Achieving new effects in the Electromagnetic Spectrum (EMS) domain to include directed energy and radio frequency disruption - Evaluating low-cost, efficient or innovative international capabilities ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Space Resilience and Electromagnetic Spectrum Agility Areas: - Taking proactive and reactive defensive measures (Avoidance), designing systems with enhanced survivability features (Robustness), conducting operations to replenish lost or diminished capacity (Reconstitution) and help re-establish space capability and capacity (Recovery) - Enhancing subsystems and exploring activities that support any systems architecture able to achieve effects normally associated with current space systems - Gaining and attaining access to spectrum for friendly forces, denying and/or degrading spectrum to our adversaries - Conducting Electromagnetic (EM) deception operations to degrade an adversary's understanding of our intent and capability - Preventing the adversary from leveraging the EM domain to conduct operations in other domains (i.e., air, space, maritime, land and cyber)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Achieving new effects in the Electromagnetic Spectrum (EMS) domain to include directed energy and radio frequency disruption - Evaluating low-cost, efficient or innovative international capabilities in the EMS domain for deception operations to degrade an adversary's understanding of our intent and capability			
Title: Force Logistics Focus Areas ***Description:*** FCT will invest in cross-domain, innovative Force Logistic technologies for new and emerging capabilities with international partners, including but not limited to these Defense-wide requirements that are consistent with strategic priorities: Reducing Soldier Load, Interoperability across Platforms and Systems, and Energy Solutions. ***FY 2016 Plans:*** During FY 2016, FCT will focus on selecting projects supporting the below Force Logistics Areas: - Reducing soldier load reduces the weight currently sustained by the individual dismounted soldier, including materials that enable weight reduction to individual weapons, ammunition, or portable missile systems - Increasing interoperability across Platforms and Systems will invest into technologies for mission-based on-demand routing, network, and information management, with a focus on command and control interoperability with coalition capabilities through integrated multi-level security enabled networks. Transition of Modular Open Systems Approach (MOSA) capabilities which are portable, modular, partitioned, scalable, extendable, and secure - Improving energy solutions will include power systems and electronics designed for extreme cold to support arctic strategy and renewable energy options that can reduce force support and logistics requirements ***FY 2017 Plans:*** During FY 2017, FCT will focus on selecting projects supporting the below Force Logistics Areas: - Reducing soldier load reduces the weight currently sustained by the individual dismounted soldier, including materials that enable weight reduction to individual weapons, ammunition, or portable missile systems - Increasing interoperability across Platforms and Systems will invest into technologies for mission-based on-demand routing, network, and information management, with a focus on command and control interoperability with coalition capabilities through integrated multi-level security enabled networks. Transition of MOSA capabilities which are portable, modular, partitioned, scalable, extendable, and secure - Improving energy solutions will include power systems and electronics designed for extreme cold to support arctic strategy and renewable energy options that can reduce force support and logistics requirements	-	3.150	5.451
Accomplishments/Planned Programs Subtotals	21.128	24.782	19.343

C. Other Program Funding Summary ($ in Millions)

N/A

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C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Successful FCT's can transition to acquisition via several ways: as a pre-EMD prototype the item tested could be a technology upgrade insertion into a current platform or program providing greater capability or prolonging the life of the weapon system. If the item was a proof-of-principle prototype the testing results could lead to informed/refined requirements generation providing better outcome for current planned U.S. system or could lead to a direct transition/procurement should the item/ article provide a new capability.

E. Performance Metrics

Strategic Goals Supported:
- Develop and Demonstrate Proof-of-Principle prototypes that fill capability gaps.
- Develop and Demonstrate Pre-EMD prototypes that address DoD strategic priorities.
- Develop and Demonstrate a prototype that informs/refines the acquisition process.

Measurable Outcomes:
- FCTs will demonstrate capability objectives within 24-36 months.
- In FY 2015, FCT had a transition rate of 73 percent for completed projects, exceeding the objective of 40 percent for demonstration programs. With a shift from Program Element 0605130D8Z to Program Element 0603133D8Z and focus on countering emerging threats as opposed to current threats, the transition rate is expected to decrease but the program will have more significant impact.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	55.961	17.889	18.765	17.256	-	17.256	18.679	18.815	19.074	19.448	Continuing	Continuing
P225: *Joint DOD/DOE Munitions*	55.961	17.889	18.765	17.256	-	17.256	18.679	18.815	19.074	19.448	Continuing	Continuing

A. Mission Description and Budget Item Justification

The mission of the Department of Defense (DoD)/Department of Energy (DOE) Joint Munitions Technology Development Program (JMP) is to develop new and innovative warhead, explosive, fuzing, and lifecycle technologies and tools to enable major improvements in conventional munitions. The JMP supports the development and exploration of advanced munitions concepts and enabling technologies that precede Service-specific system engineering. A Memorandum of Understanding signed in 1985 by DoD and DOE provides the basis for the cooperative effort and for cost-sharing the long-term commitment to this effort. The JMP funds budgeted in this justification are matched dollar for dollar by DOE funds. Through this interdepartmental cooperation, DoD's relatively small investment leverages DOE's substantial investments in intellectual capital and highly specialized skills, advanced scientific equipment and facilities, and computational tools not available within DoD. Under the auspices of the JMP, the integration of DOE technologies with Joint and Individual Services' needs has provided major advances in warfighting capabilities over many years and continues to play a crucial role in the exploration, development, and transition of new technologies needed by the Services.

The JMP seeks to develop technological advances in several munitions subject areas. These include: 1) improved modeling and simulation tools for munitions design and evaluation, including evaluation of vulnerability and the design of insensitive munitions (IM), 2) novel experimental techniques and material property databases to support modeling and simulation, 3) higher power and safer explosives and propellants, 4) miniaturized, lower-cost, and higher reliability fuzes, initiators, power systems, and sensors, 5) design tools to enable development of higher performance warheads and weapons, such as penetrators, that are hardened against high impact loads, and 6) tools to assess the health and reliability of the munitions stockpile and predict lifetimes based on these assessments. The supporting experimental research requires the development of new technologies related to the synthesis, processing, and characterization of advanced munition materials, components, and systems. This involves energetic material research, new fuzing concepts, dynamic testing of munition materials, and advanced characterization including high-rate in-situ diagnostics.

The JMP is aligned with the Department's strategic plans and policies such as:

- Munitions for contingency operations, particularly for the reduction of unintended collateral effects.
- Reducing time and cost for acquisition of munitions.
- Rapidly transitioning science and technology (S&T) to support the warfighter in today's conflicts.
- Establishing future core capabilities and maintaining our national S&T capabilities through joint investment and interagency cooperation and teaming.
- Aiding in recruiting and retaining high-caliber scientists and engineers at DoD S&T organizations.
- Developing advanced munitions technologies to support the increased role of conventional weapons to deter and respond to non-nuclear attack, as described in the Nuclear Posture Review report.
- Developing safer munitions that are compliant with IM standards to meet statutory and Department policy requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*

The JMP has established a successful collaborative community of DoD and DOE scientists and engineers. This community develops technologies of interest to both Departments within a structured framework of technical reviews and scheduled milestones. The JMP is administered and monitored by the Office of the Secretary of Defense (OSD) and reviewed annually by the Munitions Technical Advisory Committee (TAC), which is comprised of over 25 senior executives from the Army, Navy, Air Force, Special Operations Command, the Defense Threat Reduction Agency, OSD, and DOE. Projects are organized in eight Technology Coordinating Groups (TCG) that bring together the disciplines necessary to properly evaluate technical content, relevance, and progress. The TCGs conduct semi-annual technical peer reviews of JMP projects and plans. DoD Service laboratory technical experts lead each of the TCGs to ensure that the technologies under development address high-priority DoD needs. The JMP also promotes more in-depth technical exchange via short-term visiting scientist and engineer assignments at both the DOE and the DoD laboratories.

The JMP has a long history of successful transitions and significant Return on Investment (ROI).

• The JMP is the primary developer of high-performance structural mechanics computer codes used by DoD, and the primary source for transitioning these codes to the DoD. JMP computational tools are critical to the development and support of DoD programs; a recent tabulation shows that well over 70 DoD programs have been supported by these DOE codes. For FY 2014 it was projected by the High Performance Computing Modernization Program (HPCMP) that JMP-supported codes accounted for 82 percent of all HPCMP Central Processing Unit (CPU) hours, including virtually all HPCMP classified computing. The Department expects this heavy reliance on DOE codes to continue for several reasons, including: preference for using DOE codes because they are export-controlled; DOE codes are scalable, incorporate multiphysics, and run on massively parallel computer systems; and the Department can obtain source codes to modify for individual Service needs. A significant number of defense industrial contractors also use the DOE structural mechanics computer codes.
- The Army Armament Research, Development & Engineering Center (ARDEC) has stated that the DOE computer codes are now routinely used to design all new warheads. The use of these tools has reduced the number of validation tests required for each new warhead from about five to one with concomitant cost and time savings.
- The Army Research Laboratory has used DOE computer codes to develop and deploy new armor solutions to Iraq and Afghanistan with unprecedented speed.
- CHEETAH, a standalone thermochemical computer code, is the most widely used code by DoD and defense contractors for predicting performance of energetic materials.
- The JMP-supported ALE 3D code was used in a high-explosive press accident investigation which helped determine the root cause. The code was also utilized successfully in the M433E1 mortar bomb design, and has been used to assess blast effects on Unmanned Aerial Vehicles.
- The JMP-supported CTH and Sierra codes were used for the Air Force Massive Ordnance Penetrator (MOP) Quick Reaction Effort (QRC), and the Air Force Research Laboratory Conventional Survivable Ordnance Package (CSOP).

• New munitions' case material and explosive fill technologies provide the warfighter with a lethal and low collateral damage capability. These technologies have been transitioned to the Focused Lethality Munition variant of the Small Diameter Bomb, which is currently fielded. The technologies were also the basis for a new GBU 129 weapon that has been developed to meet a Joint Urgent Operational Need requirement for a low-collateral MK-82 class weapon. The GBU-129/B received the 2014 William J. Perry Award from the Precision Strike Association, recognizing significant contributions to the development, introduction, or support of precision strike systems.

• The Joint Improvised Explosive Device Defeat Organization (JIEDDO) has supported applications of JMP technologies, including: compact synthetic aperture radar (SAR) systems for counter-Improvised Explosive Device (IED) efforts; pre-deployment training of military personnel by DOE explosive experts on how to recognize feed

stocks and processes for homemade explosives; and use of massively parallel, multiphysics computer codes to understand how explosive blast waves cause brain injury and how to mitigate these injuries.

- An erosive initiator technology developed under the JMP has been transitioned to the Services for use in selectable output weapons and self-destruct capabilities.
- A novel approach to controlling the sensitivity and therefore the initiability of explosives using microwave energy, as well two new, insensitive energetic materials have transitioned to development projects in the Joint IM Technology and Joint Fuze Technology Programs.
- Reliability analysis tools were used by Army Missile Command to assess Rolling Airframe Missile (RAM), Advanced Medium Range Air to Air Missile (AMRAAM), and Tube-launched, Optically-tracked, Wire command data-linked guided Missile (TOW).
- Robotic demilitarization processing systems were installed at several locations, including a system at Hawthorne Army Depot to recover copper shape charge liners, Comp A5, and grenade bodies.
- Characterization and analysis of the Army's Excalibur fusible plug resulted in a savings of at least $2.000 million.
- The Mortar, Anti-Personnel, Anti-Materiel (MAPAM) projectile used the ViscoSCRAM (Statistical CRAck Mechanics)model for PBXN-110 to determine if flaws in production could safely be fired, potentially saving millions of dollars.
- Provided Photonic Doppler Velocimetry (PDV) adaption technology to a number of DoD laboratories, including ARDEC and ARL.
- Materials and modeling technologies developed and demonstrated in the JMP are being transitioned to a variety of DoD Army programs including the Scalable Technology for Adaptive Response (STAR) Army Technology Objective (ATO), the Future Requirements of Enhanced Energetics for Decisive Munitions (FREEDM) program, and Advanced Warheads for Scalable Effects Munitions (AWSEM).

The JMP also works with the Defense Ordnance Technology Consortium (DOTC) and the National Armaments Consortium (NAC) of industrial suppliers to equitably and efficiently transition JMP technologies to defense industrial contractors. In addition to the computer codes mentioned earlier, the JMP has transitioned case technology for low-collateral weapons, low-temperature co-fired ceramic technology for smaller, less expensive fuze electronic components, and erosive initiator technology for selectable effects weapons to defense industrial suppliers.

The integrated DoD and DOE efforts within the JMP are transitioning new munitions' technologies to the Department and the defense industrial base through the advanced development process. The JMP is a focal point for collaborative work by nearly 300 DoD and DOE scientists and engineers. Technical leaders from both Departments consider the JMP a model of cooperation, both within their respective departments and between departments. The highly challenging technical objectives of the 31 current and two planned JMP projects require multi-year efforts and sustained, long-term investments to achieve success.

The JMP projects are divided into five technical focus areas: 1) Computational Mechanics and Material Modeling, 2) Energetic Materials, 3) Initiators, Fuzes, and Sensors, 4) Warhead and Penetration Technology, and 5) Munitions Lifecycle Technologies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603225D8Z *I Joint DOD/DOE Munitions Technology Development*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	19.308	18.802	18.867	-	18.867
Current President's Budget	17.889	18.765	17.256	-	17.256
Total Adjustments	-1.419	-0.037	-1.611	-	-1.611
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.632	-			
• Realignment for Higher Priority Programs	-	-	-1.478	-	-1.478
• FY15 Reprog. for Cancelled Account	-0.007	-	-	-	-
• Other Reprogrammings	-0.780	-	-	-	-
• FFRDC Reduction	-	-0.037	-	-	-
• Economic Assumptions	-	-	-0.133	-	-0.133

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	Project (Number/Name) P225 / *Joint DOD/DOE Munitions*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P225: *Joint DOD/DOE Munitions*	55.961	17.889	18.765	17.256	-	17.256	18.679	18.815	19.074	19.448	Continuing	Continuing

A. Mission Description and Budget Item Justification

The mission of the Department of Defense (DoD)/Department of Energy (DOE) Joint Munitions Technology Development Program (JMP) is to develop new and innovative warhead, explosive, fuzing, and lifecycle technologies and tools to enable major improvements in conventional munitions. The JMP supports the development and exploration of advanced munitions concepts and enabling technologies that precede Service-specific system engineering. A Memorandum of Understanding signed in 1985 by DoD and DOE provides the basis for the cooperative effort and for cost-sharing the long-term commitment to this effort. The JMP funds budgeted in this justification are matched dollar for dollar by DOE funds. Through this interdepartmental cooperation, DoD's relatively small investment leverages DOE's substantial investments in intellectual capital and highly specialized skills, advanced scientific equipment and facilities, and computational tools not available within DoD. Under the auspices of the JMP, the integration of DOE technologies with Joint and Individual Services' needs has provided major advances in warfighting capabilities over many years and continues to play a crucial role in the exploration, development, and transition of new technologies needed by the Services.

The JMP seeks to develop technological advances in several munitions subject areas. These include: 1) improved modeling and simulation tools for munitions design and evaluation, including evaluation of vulnerability and the design of insensitive munitions (IM), 2) novel experimental techniques and material property databases to support modeling and simulation, 3) higher power and safer explosives and propellants, 4) miniaturized, lower-cost, and higher reliability fuzes, initiators, power systems, and sensors, 5) design tools to enable development of higher performance warheads and weapons, such as penetrators, that are hardened against high impact loads, and 6) tools to assess the health and reliability of the munitions stockpile and predict lifetimes based on these assessments. The supporting experimental research requires the development of new technologies related to the synthesis, processing, and characterization of advanced munition materials, components, and systems. This involves energetic material research, new fuzing concepts, dynamic testing of munition materials, and advanced characterization including high-rate in-situ diagnostics.

The JMP is aligned with the Department's strategic plans and policies such as:

- Munitions for contingency operations, particularly for the reduction of unintended collateral effects.
- Reducing time and cost for acquisition of munitions.
- Rapidly transitioning science and technology (S&T) to support the warfighter in today's conflicts.
- Establishing future core capabilities and maintaining our national S&T capabilities through joint investment and interagency cooperation and teaming.
- Aiding in recruiting and retaining high-caliber scientists and engineers at DoD S&T organizations.
- Developing advanced munitions technologies to support the increased role of conventional weapons to deter and respond to non-nuclear attack, as described in the Nuclear Posture Review report.
- Developing safer munitions that are compliant with IM standards to meet statutory and Department policy requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

The JMP has established a successful collaborative community of DoD and DOE scientists and engineers. This community develops technologies of interest to both Departments within a structured framework of technical reviews and scheduled milestones. The JMP is administered and monitored by the Office of the Secretary of Defense (OSD) and reviewed annually by the Munitions Technical Advisory Committee (TAC), which is comprised of over 25 senior executives from the Army, Navy, Air Force, Special Operations Command, the Defense Threat Reduction Agency, OSD, and DOE. Projects are organized in eight Technology Coordinating Groups (TCG) that bring together the disciplines necessary to properly evaluate technical content, relevance, and progress. The TCGs conduct semi-annual technical peer reviews of JMP projects and plans. DoD Service laboratory technical experts lead each of the TCGs to ensure that the technologies under development address high-priority DoD needs. The JMP also promotes more in-depth technical exchange via short-term visiting scientist and engineer assignments at both the DOE and the DoD laboratories.

The JMP has a long history of successful transitions and significant Return on Investment (ROI).

• The JMP is the primary developer of high-performance structural mechanics computer codes used by DoD, and the primary source for transitioning these codes to the DoD. JMP computational tools are critical to the development and support of DoD programs; a recent tabulation shows that well over 50 DoD programs have been supported by these DOE codes. For FY 2014 it is projected by the High Performance Computing Modernization Program (HPCMP) that JMP-supported codes will have accounted for 82 percent of all HPCMP Central Processing Unit (CPU) hours, including virtually all HPCMP classified computing. The total CPU hours represents an eight-fold increase from FY 2012. The Department expects this heavy reliance on DOE codes to continue for several reasons, including: preference for using DOE codes because they are export-controlled; DOE codes are scalable, incorporate multiphysics, and run on massively parallel computer systems; and the Department can obtain source codes to modify for individual Service needs.
- A significant number of defense industrial contractors also use the DOE structural mechanics computer codes.
- Cheetah, a standalone thermochemical computer code, is the most widely used code by DoD and defense contractors for predicting performance of energetic materials.
- The Army Armament Research, Development & Engineering Center (ARDEC) has stated that the DOE computer codes are now routinely used to design all new warheads. The use of these tools has reduced the number of validation tests required for each new warhead from about five to one with concomitant cost and time savings.
- The Army Research Laboratory has used DOE computer codes to develop and deploy new armor solutions to Iraq and Afghanistan with unprecedented speed.

• New munitions' case material and explosive fill technologies provide the warfighter with a lethal and low collateral damage capability. These technologies have been transitioned to the Focused Lethality Munition variant of the Small Diameter Bomb, which is currently fielded. The technologies were also the basis for a new GBU 129 weapon that has been developed to meet a Joint Urgent Operational Need requirement for a low-collateral MK-82 class weapon. The GBU-129/B received the 2014 William J. Perry Award from the Precision Strike Association, recognizing significant contributions to the development, introduction, or support of precision strike systems.

• The Joint Improvised Explosive Device Defeat Organization (JIEDDO) has supported applications of JMP technologies, including: compact synthetic aperture radar (SAR) systems for counter-Improvised Explosive Device (IED) efforts; pre-deployment training of military personnel by DOE explosive experts on how to recognize feed stocks and processes for homemade explosives; and use of massively parallel, multiphysics computer codes to understand how explosive blast waves cause brain injury and how to mitigate these injuries.

• The JMP-supported CTH and Sierra codes were used for the Air Force Massive Ordnance Penetrator (MOP) Quick Reaction Effort (QRC), and the Air Force Research Laboratory Conventional Survivable Ordnance Package (CSOP).

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

• An erosive initiator technology developed under the JMP has been transitioned to the Services for use in selectable output weapons and self-destruct capabilities.
• A novel approach to controlling the sensitivity and therefore the initiability of explosives using microwave energy, as well two new, insensitive energetic materials have transitioned to development projects in the Joint IM Technology and Joint Fuze Technology Programs.
• Reliability analysis tools were used by Army Missile Command to assess Rolling Airframe Missile (RAM), Advanced Medium Range Air to Air Missile (AMRAAM), and Tube-launched, Optically-tracked, Wire command data-linked guided Missile (TOW).
• Robotic demilitarization processing systems were installed at several locations, including a system at Hawthorne Army Depot to recover copper shape charge liners, Comp A5, and grenade bodies.
• Characterization and analysis of the Army's Excalibur fusible plug resulted in a savings of at least $2.000 million.

The JMP also works with the Defense Ordnance Technology Consortium (DOTC) and the National Armaments Consortium (NAC) of industrial suppliers to equitably and efficiently transition JMP technologies to defense industrial contractors. In addition to the computer codes mentioned earlier, the JMP has transitioned case technology for low-collateral weapons, low-temperature co-fired ceramic technology for smaller, less expensive fuze electronic components, and erosive initiator technology for selectable effects weapons to defense industrial suppliers.

The integrated DoD and DOE efforts within the JMP are transitioning new munitions' technologies to the Department and the defense industrial base through the advanced development process. The JMP is a focal point for collaborative work by nearly 300 DoD and DOE scientists and engineers. Technical leaders from both Departments consider the JMP a model of cooperation, both within their respective departments and between departments. The highly challenging technical objectives of the 33 current JMP projects require multi-year efforts and sustained, long-term investments to achieve success.

The JMP projects are divided into five technical focus areas: 1) Computational Mechanics and Material Modeling, 2) Energetic Materials, 3) Initiators, Fuzes, and Sensors, 4) Warhead and Penetration Technology, and 5) Munitions Lifecycle Technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Computational Mechanics and Material Modeling	5.464	5.581	5.197
Description: Projects in this technical focus area develop physics-based computational tools, material models, and calibration and validation databases that support the design and development of weapon systems. These capabilities are intended to predict the complex phenomena across significant length, meso to continuum, and time, microsecond to minute, scales. The tools will provide coupled, multi-physics and chemistry modeling capabilities that are scalable to massively parallel architectures for solving very diverse problems across the weapons systems' research and development and acquisition communities. Numeric tools are the foundation that makes possible the integration of mechanics, materials science, physics, and chemistry. This focus area also includes an extensive experimental component consisting of either: 1) phenomenological or "discovery" experiments that provide the physics basis for model development, 2) experiments directly coupled to model development and application, such as characterization, calibration, and validation experiments, or 3) the development of advanced test methods or device development. The specific projects in computational mechanics and material modeling are:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- CTH shock physics and Sierra/Solid Mechanics (SM) codes & model development and supporting experiments. - Arbitrary Lagrangian-Eulerian Three-Dimensional (ALE3D) code and model development. - Composite case technology and modeling - Dynamic properties of materials, modeling and validation - Energetic materials and polymers under dynamic and thermal loading - Fragment impact and response experiments ***FY 2015 Accomplishments:*** - Released CTH Version 11.1 with improved reactive flow modeling, enhanced algorithms for multi-material behavior, and emphasis on hardware, software environments for developing/emerging technologies. - Released Sierra v4.36 with improved documentation sets, including additional sample problems, verification manuals, and documentation addenda for modeling shock response. - Demonstrated fluid-structure interaction capabilities utilizing Sierra/Solid Mechanics-based code couplings along with pervasive failure techniques. - Developed a flat projectile launch capability with a 60 mm gun, enabling large-scale impact tests with multiple impact points. - Several improvements implemented in the Arbitrary Lagrangian-Eulerian 3-Dimensional (ALE3D) code package, including: Expanded element erosion criteria to be compatible with multi-physics, Detonation Shock Dynamics (DSD) treatment of inert boundaries for three dimensional geometries, enhanced boundary conditions (heatgen, pressure beam, temperature dependent surface tension, 2D tractions, vapor recoil, mass generation), implemented pseudo-reactive zone algorithm for improved program burn, Condition Number relaxer developed for better mesh control, automatic void shaping of foreground material provided for Feusion embedded mesh, improved ALE3D-Paradyn coupling, and accounted for High Explosive (HE) densification in Ignition & Growth reactive flow model. - Concluded crystal mechanics-based study of spall response in copper and examination of microstructure sensitivities. - Composite shell element development completed and work submitted for publication. ABAQUS subroutine code delivered to Lawrence Livermore National Laboratory for ALE3D implementation. - Provided connection between ABAQUS and Dream3D codes for meso-scale work in support of study of damage response. - Initial release of CartaBlanca code to DoD. Supports transition of CartaBlanca as general tool for use in typical DoD weapon calculations. - Enhanced the modeling of material failure and fragmentation via void insertion coupled directly through the GursonD model. - Elastic and failure parameters for ALE3D material models were fit to a woven fiber composite material model using an optimization approach that incorporated three distinct compression tests of the material. - Characterized shock and damping response of commonly used carbon fiber materials.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed mini-bulge damage test development, demonstration, and analysis of results. Journal article describing results submitted for publication.			
FY 2016 Plans:			
- Final report on experimental quantification of microstructure, interfaces, and damage in relation to mechanical behavior for energetic materials.			
- Transition Glassy Amorphous Polymer (GAP) Damage model to DOE code teams.			
- Coupled Fast Fourier Transform (FFT) and/or ViscoPlasticSelfConsistent (VPSC) models with Damage Evolution implemented in ALE3D for use by DoD community in calculations requiring efficient treatment of plasticity.			
- Complete meso-scale study of stress conditions and statistics of loading in the vicinity of grain boundaries for DoD tantalum (Ta).			
- Enhance High-Energy Diffraction Microscopy (HEDM) capability to larger plastic deformation.			
- Incorporate Thermal/Equation of State (EOS) data in material model parameter database.			
- Enable 2D corner turning in Detonation Shock Dynamics (DSD) code.			
- Test and model damping response in composite specimens.			
- Minimum Signature Propellant-1 (MSP-1) characterized for Reactive Flow Model(s) and analysis of Army Burn-to-Violent-Reaction (ABVR) test and integrated experiments.			
- Over-driven EOS and sound speed experiments on relevant energetic materials using two-stage or three-stage gun.			
- Demonstration of Uncertainty Quantification (UQ) Capabilities in Sierra coupled codes through integration with the Sierra User Interface.			
- Release CTH versions 11.3 and 12.0. Incorporate exascale improvements in version 12.0.			
- Characterization and modeling of shock propagation in existing composite models for ALE3D, fit to Sandia National Laboratories (SNL) data.			
- Test and model the damping response of composite specimens.			
- Develop a 6-axis winder capable of changing angle at mid-length and printing with filament.			
- Demonstrate Multiple-Impact fragment impact capability.			
- Impact heated Plastic Bonded eXplosive (PBX) 9502 targets using a 0.5 inch flat projectile.			
- Develop the capability to launch concave fragments.			
- Test targets of interest using multiple impact points.			
- Apply existing robust hydrodynamic flow modeling capability to find the spectrum of impact definitions that are expected to lead to Mach stem initiation.			
- Design and conduct new experiments to further validate or refine the Generalized Initiation Criterion.			
- Characterize Minimum Signature Propellant (MSP) for Reactive Flow model and analysis of Army Burn-to-Violent Reaction (ABVR) tests.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Assess performance of 2D embedded zone performance against 316L Stainless Steel (SS) test data and propose next technology steps. - Complete Fast Fourier Transfer-based non-local plasticity models and micro-inertia effects. - Complete meso-scale study of stress conditions and statistics of loading in the vicinity of grain boundaries for DoD Tantalum. - Select appropriate pathways for introducing CartaBlanca to the DoD user community. - Release ALE3D v4.26, with numerous capability enhancements and improvements to usability. - Perform experiments utilizing HEDM+tomography to characterize incipient void nucleation and growth in Ti; validated results against crystal-scale damage mechanics model. - Report strain rate dependent strength data in compression and shear collected on specimens representative of system response. - Characterize and modeled shock propagation using existing composite models in ALE3D (ysmodel 140), with fit to SNL-provided data. ***FY 2017 Plans:*** - Demonstrate concave projectile fragment capability by firing into heated and ambient PBX 9502. - Decision gate whether to continue to pursue a Generalized Initiation Criterion. - Perform over-driven EOS and sound speed experiments on relevant energetic materials using two-stage or three stage gun. - Demonstrate three-dimensional solid extended finite element (XFEM) fracture capabilities - Release CTH Version 11.3 with next-generation platform improvements. - Provide equation of state data on glass fiber reinforced polymer material. - Simulate a projectile penetration event that can exhibit multiple modes of failure, such as plugging and shear bands. - Develop three-dimensional formulation of the two-component localization model for use in 3D fragmentation problems where adiabatic shear banding is dominant. - Complete experimental suite to quantify nucleation and growth behavior of adiabatic shear bands in 316L SS, transition to targeted light source experiments. - Complete grain boundary model for use in both meso-scale theory as well as to motivate macro-scale porosity based damage model. - Continue development of CartaBlanca code for failure and fragmentation problems.			
Title: Energetic Materials (EM)	5.080	4.942	4.478
Description: The goals of this technical focus area are to develop new Energetic Materials (Ems) and supporting technologies to satisfy the competing requirements for smaller, more lethal, and safer munitions. Work is primarily focused on explosives, gun and rocket propellants, and, to a lesser extent, pyrotechnics. The projects include development of: 1) new EMs, including new molecules in a range of particle sizes and morphologies, 2) new EM formulations, 3) a fundamental understanding of			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
energetic properties and performance, and 4) computational tools for analysis of performance and sensitivity. New materials and formulations are developed with the recognition that costs must be reasonable, chemical feed stocks reliable, and manufacturing processes suitable for scale-up to production levels. Both Federal statute and Department policy direct the development of safer, less sensitive munitions. Making munitions less sensitive while maintaining explosive or propellant performance is a difficult challenge. This goal is best attained through a combination of new EM development, EM characterization, and more sophisticated modeling and simulation tools. It is cost prohibitive to qualify weapons for compliance with insensitive munitions requirements through testing alone. A better, and in many cases the only means, to qualify these weapons is with the combination of analysis based on validated computational tools and a few well-designed tests. The Department also needs munitions that provide selectable effects. To achieve these effects, weapons designers need to thoroughly understand the performance of EMs used in both the main weapon fill and the initiation systems. Distributed fuzing systems can provide selectable effects as well as safer munitions, but such complex, small-scale systems require more complete knowledge of EM detonation physics and in some cases, new EMs designed for this application. The desire for smaller and lighter munitions is driven in part by the increasing dependence on unmanned weapons platforms and to some extent by the need to reduce logistical burden, especially energy consumption. New EMs are needed to meet the munitions weight and size requirements while maintaining lethality, effects, and safety. The Department is working to increase the range and velocity of weapons and to develop weapons against hardened targets. These applications subject EMs to high accelerations and shock loads. To support the development of these new systems, we need to improve our ability to model EM under higher impact loads and to characterize relevant properties to determine their ability to survive in these aggressive environments. DoD may also need to develop new, more robust EMs that survive impact loads while maintaining lethality and initiability. TCG-III is also a forum for the exchange of information on new energetic materials, their performance and sensitivity characteristics, and physical models that can be used to predict the behavior of energetics under adverse and unplanned conditions. It is a venue in which collaboration opportunities can be identified to facilitate the transition of technology developed in the DOE to the DoD. The specific projects in the energetic materials technical focus area for FY16 are: - Synthesis, properties, and scale-up of new energetic compounds. - Insensitive munitions and surety. - Cheetah thermochemical code development and experiments.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Micro- and nano-energetics synthesis and initiation. - Hazards analysis of energetic materials. - Reactive processes in energetic materials. - Development of tools for energetic material performance characterization. - Explosives chemistry and properties, and new energetic materials formulation. - Thermal response of energetic materials. ***FY 2015 Accomplishments:*** - Benchmarked High Explosive Reaction to Mechanical Stimulus (HERMES) model to sub-detonative fragment impact response experiments. - Performed cook-off-induced Deflagration to Detonation Transition (DDT) experiments. - Delivered completed Disc Acceleration eXperiment (DAX) design for non-ideal EMs. - Published best available models and Sandia Instrumented Thermal Initiation (SITI) data for pressure dependence and gas generation rates of thermal decomposition of a representative MSP and Pentaerythritol tetranitrate (PETN). - Delivered a low temperature aging study detailing the unusual thermal reactions occurring between ammonium perchlorate (AP) and RDX in Navy underwater explosives that contribute to thermal cook-off. - Scaled-up synthesis of the target compounds LLM-212, LLM-227 and LLM-228 to the 10 grams scale, and characterized by small-scale safety test measurements, density and heat of formation measurements. - Applied microcomputed tomographic (microCT) imaging diagnostic in as-received AP/aluminum propellants. - Developed Shock to Detonation Transition (SDT) model parameters for a variety of MSP types relevant to predicting Fragment Impact (FI) response. - Developed capability for reactive mesoscale simulations of shock initiation in HMX-based explosives. - Released Cheetah 8.0 with enhanced performance prediction capabilities for a wide range of energetics. - Expanded thermochemistry for many elements, particularly alkali metals and lanthanides. - Developed mask and experiment to examine effect of metal on detonation failure using incorporated metal films. - Developed two deposition conditions for Hexanitro-stilbene (HNS) that result in different microstructures. - Characterized sensitivity properties of C,H,N,O oxidizer materials. - Achieved spontaneous conductive burning dynamic data without synchronization in low density PBX 9502. ***FY 2016 Plans:*** - Scale-up the synthesis of LLM-227 and LLM-228 to the 10-gram scale. - Synthesize and characterize new tri-, quadri-, and pentacyclic oxadiazoles as both high-power and insensitive target molecules. - Publish best available models and SITI data for pressure dependence and gas generation rates of thermal decomposition of a representative MSP and PBX 9501.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Performed heat of formation measurements on LLM-200, 223, and 215. - Publish results of characterization of damage evolution of PBX 9502 and AP propellant, including permeability as a function of temperature history. - Experimentally correlate burn rates to thermal damage state and publish results. - Complete MSP1 characterization for unknown-to-detonation transition (XDT) model parameterization. - Benchmark cook-off violence model of HMX-based PBX using thermal-damage burn-rate with sub-scale experiments. - Complete mesoscale sensitivity study to determine key factors for shock initiation response in HMX-based explosive. - Complete Technology Handbook design, install on server, and load database with new LLNL molecules that have been tested. - Deliver first kinetics tool for non-ideal EMs front curvature. - Systematically evaluate and improve code predictions at low Pressure/high Temperature for specific impulse and impetus predictions by expanding library of gaseous and condensed products available for such calculations. - Develop and implement a consistent ionic thermodynamics capability to improve equation of state (EOS) and speciation predictions for all energetic materials. - Develop post-detonation carbon kinetics models for conventional and insensitive high explosives. Test and validate against small scale experiments. - Develop Cheetah thermochemistry for major metallic additives, and other relevant elements and compounds, (e.g., oxides, fluorides, nitrides, carbides, and borides) to enable thermochemical predictions for elementally rich formulations. - Report on deposition, microstructure and initiation properties deposited HNS. - Demonstrate small-scale flash radiography of research detonators. - Full dynamic radiographic comparison of Composition B (CompB) and IMX 104 explosives.			
FY 2017 Plans: - Synthesis of new cyclic, planar structures consisting of imidazole or pyazole arrays. - Publish results of characterization of damage evolution of gun propellants. - Benchmark Spiral 1 MSP1 HERMES/XDT with cylindrical ABVR experiments. Perform pre-test predictions for analog rocket motor fragment impact tests. - Perform X-ray measurements of burn-rates and DDT. - Deliver second kinetics tool for non-ideal EM's, possibly initiation behavior. - Integrate CHEETAH code capabilities to facilitate exploratory calculations (e.g., constant volume explosions at user specified conditions, EOS tables for hydro simulations, and multiple constraints on formulation performance). - Perform experiments on milling technique for nanomaterial production. - Report on aging of PBXN-103 underwater explosive formulation. - Report on first use of Lattice Boltzmann and/or Kinetic Monte Carlo Methods to model multiscale reaction processes. - Perform sensitivity testing of energetic binder candidates.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Mechanistic determination of the insensitivity of TATB-based formulations.			
Title: Initiators, Fuzes, and Sensors	3.370	3.637	3.699

Description: The goals of this technical focus area are to develop new materials, components, diagnostic techniques, and modeling and simulation tools for fuzing systems. Initiators, fuzes, and sensors must work reliably together to prevent unintended detonation, to correctly detect intended targets, and to initiate detonation when required. Projects in this focus area support the Department's needs to miniaturize fuzing systems. Smaller systems are required for several reasons including: 1) compatibility with smaller and lighter weapons systems, 2) trading volume in munitions for other components such as additional explosives, higher energy and power density power sources, or enhanced guidance systems, 3) increasing reliability through redundancy, for example, using of two or more smaller initiating systems, and 4) upgrading existing sub-munitions with smarter and more reliable fuzing systems.

The miniaturization of fuzing systems requires new material and components, new power systems, new diagnostic techniques, and improved modeling tools for microdetonics. The Department also needs weapons systems with selectable effects, and these effects may be achieved with multi-point initiation systems. Such systems are inherently more complex and require improved characterization of initiator materials and components, as well as more sophisticated modeling and simulation tools. To attain greater precision and to avoid unintended collateral effects when weapons are used in the complex environment of counter-insurgency or counter-terrorist operations, target sensors must be reliable and provide high-fidelity discrimination. Projects in this focus area are developing technologies to achieve this level of performance in compact packages.

The specific projects in the initiators, fuzes, and sensors technical focus area are:
- Firing Systems Technology, comprising FireMod firing set code model development and validation, 1.6 hazard classification detonator development, and initiation and detonation physics on the millimeter scale.
- Safe, Arm, Fuze and Fire Technology, comprising Initiation and Detonation, and Advanced Firing System Components.
- Advanced Initiation Systems, comprising diagnostics development, microdetonics, miniature initiation systems, and detonators for enhanced safety.
- Thermal Battery Performance Modeling to develop a multi-physics modeling capability for thermal batteries.
- Thin Film Thermal Batteries (new start in FY 2015) to develop, mature, and transition a method to produce a thin, conformal, low-cost thermal battery.
- Vertical-Cavity Surface-Emitting Laser (VCSEL) sensors for proximity fuzing of munitions.
- Enabling Robust, Mode-Agile GPS-Denied Weapon Guidance through High-Efficiency Data Processing (new start in FY 2015).

FY 2015 Accomplishments:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed a new experimental capability at the Advanced Photon Source (APS); the integration of a time-resolved line velocimetry diagnostic with the IMPULSE gas gun at APS. - Conducted ongoing series of experiments at APS to study the interaction between initiators (both exploding bridge wire (EBW) and exploding bridge foil (EBF)) and detonator explosives. The goal of this research is to definitively establish the controlling initiation mechanisms in detonators. - Conducted the first-ever multi-point slapper array shot at APS. - Synthesized over 20 new organic materials, and over 20 metal complexes for experimental photochemical studies. - Demonstrated first thin film thermal battery (TFTB) coating using water and salt as an alternative binder to silica. - Assembled and tested first TFTB cells using water/salt binder at 500mA/cm2 rate. - Tested LX-21 explosive with an actual DuPont #8 test to verify the results of the 2014 test series. - Performed 'snowball' tests on LX-21, and booster initiation of PBX-9502 and LX-17. - Validated and demonstrated CL20 explosive tabular EOS. - Characterized flyer/explosive boundary condition using advanced diagnostics. - ALEGRA 1D code simulation successfully validated against 40 kV 400 mil slapper velocity data. - Demonstrated that commercially available glass feedstocks can produce capacitors with stored energy densities of greater than 30J/cm3. - Designed and fabricated low-divergence VCSEL arrays, providing a reduction in device pitch resulting in overall higher power output and system compactness. - Designed and fabricated new VCSEL arrays to emit at 940nm wavelength, greatly improving system performance for high-power transmitter operation.			
FY 2016 Plans: - Design Probabilistic Shock Threshold Criterion (PSTC) Validation Experiments to demonstrate validity in arbitrary shock analysis, (e.g., Taylor wave and fragment impact). - Analysis and theoretical model of wave divergence using PSTC. - Perform low-fidelity ignition characterization in small array configuration to verify feasibility. - Complete ignition characterization of one DoD, and one DOE EM using medium array (36 samples) combinatorial design. - Collect validation data for reactive burn and equation of state models via small-scale shock experiments. - Demonstrate 500mA/cm2 with <0.5V polarization in thin-film thermal battery against pellet anode and cathode at 525C. - Demonstrate 1.8V operation at 100mA/cm2 in thin-film thermal battery against coated separator and cathode at 525C. - Transition the next version of the TABS software (TABS-SC v4) that will include the capability to perform coupled thermo-poro-mechanical and thermo-electrochemical simulations in a single-cell axisymmetric configuration. - Plan for experiments required to validate coupled models at the battery scale. - Perform Floret experiments on LX-21 explosive.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Assess efficacy of laser initiation of HMX explosive. - Collect spot-size data to extend James Model to account for area effect in LX-16 explosive. - Collect data for assessment of bridge material equations of state and conductivity tables. - Characterize the performance of nano-TATB (triaminotrinitrobenzene). - Report on ALEGRA Lagrangian code simulations of Exploding Foil Initiator (EFI) validation data report to the Air Force Research Laboratory. - Build prototype 200nF (nanofarad) multilayer glass capacitors that can withstand 2000 Vdc (Volts Direct Current). - Completion of PIV (Particle Imaging Velocimetry) diagnostic capability. - Fabricate custom Si Avalanche PhotoDetectors (APDs) optimized for low-voltage performance and integration for the Photonic Proximity Fuze (PPF) sensor. - Prepare report summarizing GPS-denied sensor parameter space coupled with customer weapons guidance requirements. - Outline of proposed GPS-denied processor architectures with reduced size, weight, and power (SWaP). ***FY 2017 Plans:*** - Demonstrate 1.2V operation of thin-film thermal battery at 500mA/cm2 in coated configuration. - Complete implementation of insulation mechanical model and parameter fitting based on experimental data. - Expand Thermally Activated Battery Simulator (TABS) thermal material database with properties for thin film thermal battery materials, add active insulation capability to the TABS interface, and publish instructions to build and run a 3D thermal model. - Demonstrate validated fully-coupled thermo-poro-mechano-electrochemical single cell battery model. - Demonstrate model of full magneto hydrodynamic (MHD) slapper-initiating explosive train with predicted reliability, incorporating ALE3D. - Perform output characterization, large array (>80 samples). - Demonstrate an integrated modeling tool for detonator explosive performance. - Determine breakdown mechanisms in multilayer glass capacitors (MLGCs) and eliminate defect formers identified during prototype capacitor construction. - Demonstrate MLGC integration into micro fireset. - Micro-optic development, including new designs for detector collector lenses in addition to new VCSEL emitters. - Deliver initial GPS-denied sensor hardware prototype and associated radar guidance software to DoD customer for evaluation.			
Title: Warhead and Penetration Technology	3.210	3.341	3.063
Description: This focus area supports the development of new warheads and penetrator weapons through advances in materials processing and characterization, instrumentation, and computational codes. Significant increases in warhead performance are directly attributed to our ability to understand and accurately model the physics and fine details of new warhead designs, and to advances in increasingly sophisticated material processing. The Department's requirement to achieve more precise weapon			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

effects with minimum collateral damage is supported by work on controlled fragmentation, non-fragmenting warhead cases, and multiphase blast explosives (MBX). More recently, increases in performance and reductions in vulnerability are being achieved through improved warhead integration into munitions using a systems-oriented approach.

The goals for penetrator weapons are to investigate, develop, and transition advanced technologies for the design, development, and performance assessment of the next generation of high performance, precision strike weapons. This effort directly supports national initiatives to defeat hard and deeply buried targets, which are proliferating worldwide, and to deny/defeat weapons of mass destruction. The work addresses high-velocity penetration into granular materials (sand and soil), penetration into advanced high-strength and ultra-high-performance concretes, new penetrator materials and designs, and non-inertial onboard instrumentation.

The specific projects in the warhead and penetration technology focus area for FY16 are:
- Multiphase blast munitions (MBX) technology.
- Dynamic behavior of concrete. (New start in FY16)
- Integrated munitions modeling & experimentation.
- Modeling of strategic structures subject to ballistic impact or blast.
- Concrete perforation and penetration modeling and experiments.
- Explosive/metal interactions.
- Structure, mechanical & shock-loading response, and modeling of materials.
- Controlled effects warhead materials.

FY 2015 Accomplishments:
- Several improvements to ALE3D's multiphase model have been added. These enhancements include performance improvements to the particle handling and domain decomposition, new physical models for dense energetics, and improvements to the coupling between the Lagrangian particle tracking and the Eulerian fluid solver.
- Completed a suite of dynamic friction experiments to determine the dynamic friction coefficient between steel and aluminum specimen combinations, investigating the influence of surface finish, preload, and slip velocity.
- Implemented an improved method to capture the interaction between a projectile and a target material into the production version of the CTH code, allowing CTH to simulate penetration and perforation in three dimensions.
- An implicit continuous (ICE) method was added to the Multi-field model, which improves model performance by dynamically adjusting the time step between courant- and velocity-based limits.
- Improved the Multi-field numerical method for stability, robustness and accuracy.
- Completed milestone on influence of sweeping detonation-wave loading on damage evolution during spallation loading of tantalum in both a planar and curved geometry.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed the first sweeping-wave spallation experiment on curved Tantalum. - Completed initial dynamic characterization and spallation of additively manufactured 316L Stainless Steel. - The study of momentum redistribution has been addressed by an extension of N. F. Mott's original 1947 theory, derived using dominant balance mathematical analysis, and allowing for a localization to be originated by thermal softening. Theory is being validated by supporting measurements. - Initiated experiments to test the formation of Zirconium slow stretchers at elevated temperature. - Implemented a short-range contact model into Sierra Solid Mechanics for modeling perforation using coupled finite element and peridynamics approaches. - Two features were implemented in the GEODYN-L sand model to increase the accuracy of meso-scale simulations: a parallel nodal tetrahedral element explicit solver, and the ability to specify and apply statistical fields to material data such as moduli or yield parameters. - New continuum model for sand has been implemented in the GEODYN library along with verification of the model and validation of penetration simulation results.			
FY 2016 Plans: - Develop ALE3D version of multiphase model with improved and validated detonics capability informed by Meso-scale simulations. - Microstructural and constitutive property comparison of wrought vs. Additive Manufacturing-fabricated candidate metals and alloys. - Investigate powder bed printing parameters and identify suitable infiltration candidates for preformed frags, skin lattices, and structural energetics. - Complete oblique HE-driven shock hardening & damage microstructural quantification on Tantalum on flat and curved plate samples to quantify the joint effects of obliquity and curvature. - Conduct plate penetration experiments using Taylor-Anvil Facility. - Conduct sphere extrusion testing on "Nano-crystalline" Copper-Alloys and Copper-Tantalum alloys. - Verify Tensile Plasticity (TEPLA) implementation into CartaBlanca and compare improved representation of plate impact response to Lagrange code representation. - Evaluate debris-free fragmentation modeling. - Issue report on technology gaps for interface models. - Complete validation tests of gyro sensor. - Implement improvements into CTH-MPM-Multi-field model for penetration. - Complete probabilistic studies of projectile penetration/perforation. - Complete transition of Peridynamics technology to Sierra/SM code.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- ALE3D version of MBX model with validated key particulate plume transport physics, drag model and surface instabilities, through use of experiments. - Exercise ALE3D MBX capability to interact with complex (failing) targets. - Quasi-static and dynamic characterization of lattice structures. - Direct numerical simulations of architected structures under dynamic loading. - Development of constitutive models for Additive Manufactured (AM) microstructures and homogenization for lattice structures. - Design, print, and infill suitable architectures for dynamic compression. - Complete oblique HE driven shock hardening and damage microstructural characterization on Zirconium/Titanium and Copper/Lead alloys. - Transition updated materials databases and materials models. - Utilize Dynamic Tensile-Extrusion experimental facility, diagnostics, and modeling to support warhead material validation and complete shear localization studies of relevant warhead materials. - Calculate the flat-plate oblique shock experiment performed on Tantalum and compare results with experimental data and recovered sample metallography. Make observations about improvement needed to the material model and computational code. - Calculate the curved-plate oblique shock experiment performed on Tantalum and account for improvements made vice the flat-plate configuration. - Issue report on impact energy transfer across threaded interfaces. - Implement material failure models into CTH-Multipoint Method-Multi-field code. - Implement improved user interface into the Peridynamics-Multiscale (PDMS) code.			
Title: Munitions Lifecycle Technologies	0.765	1.264	0.819
Description: This focus area supports improving the Department's ability to understand measure, predict, and mitigate safety and reliability problems caused by materials aging and degradation in weapons systems. Current stockpile assessment methods typically focus on addressing materials aging and reliability problems after they occur, rather than anticipating and avoiding future problems or failure mechanisms. The overall objective of this work is to develop a toolset of computational models that are able to quantitatively predict materials aging processes and ultimately improve the long-term reliability of weapons systems, subassemblies, and/or components. These objectives are achieved by identifying aging mechanisms, quantifying the rates at which those aging mechanisms occur, developing predictive models, and using these models to predict the munitions stockpile reliability. An additional objective of this work is to develop technologies and methodologies to enable munitions health management and condition-based maintenance. The specific projects in the munitions lifecycle technologies focus area are: - Predictive Materials Aging, including solder interconnect reliability, corrosion of electronics, and adhesive degradation. - Microelectromechanical systems (MEMS) reliability.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

- Military use of commercial off-the-shelf (COTS) electronics.
- Complex system health assessment.
- Physical/chemical reactive transport modeling of material/system aging and reliability. (New start in FY16).

FY 2015 Accomplishments:

- Demonstrated that Magnesium difluoride/Nickel (MgF2/Ni)-epoxy composites effectively prevent the formation of tin whiskers.
- Built a user-friendly solder model with damage evolution rate and user interface.
- Completed the investigation of Copper-Aluminum intermetallic growth kinetics on three commercial off-the-shelf (COTS) diodes, and used the information to assess the impact on components reliability for DOE and DoD applications.
- Completed an initial bond pad corrosion model that is a physics-informed empirical model due to address the stochastic nature of the phenomenon.
- Collaborated with ARDEC to test and validate methodology for prioritizing the criticality of different stockpiles of small caliber rounds.
- Developed a software tool for evaluating different environmental exposures and usage factors for improved prediction of reliability.

FY 2016 Plans:

- Complete Package-on-Package-on-Package (PoPoP) experiments (data collection and analysis).
- Expand the Package-on-Package PoP model to include PoPoP.
- Assess flash layer approach to tin whisker mitigation.
- Generalize success model for use in other circuits
- Validate the most promising tin whisker mitigation methods in actual operating environments.
- Refine predictions of adhesive failure: napkin ring tests to identify additional parameters necessary for predictive model (e.g., cure, thermal, and/or dynamic loadings)
- Perform and report results on principle component analysis (PCA) of data generated from MEMS Gyroscope testing.
- Release to the DoD early prototype of physics-based lifetime predictive model based on physics-of-failure (PoF) approach.
- Develop methodology to compare sub-population characteristics and reliability
- Create software tools for integration Prognostics and Health Monitoring (PHM) and System Assessment (SA) methodologies and strategies, software and documentation.
- Simulated 3D multi-material aging experiments and executed 3D validation experiments, on DOE-relevant materials.
- Down selected DoD-relevant materials and worked through logistics to obtain samples for subsequent testing.

FY 2017 Plans:

- Transition tin whisker mitigation to commercial plating houses.
- Transition first principles (Dynamic recrystallinzation) tin whisker mitigation methods to industry.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603225D8Z / *Joint DOD/DOE Munitions Technology Development*	**Project (Number/Name)** P225 / *Joint DOD/DOE Munitions*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Demonstrate roll-up of bondpad & connector corrosion models to predict system performance / reliability. - Validate predictions of adhesive degradation in humid environments in a unique geometry: smooth stainless steel surfaces. - Develop Accelerated Aging MEMS protocol/statistically-based model. - Experimentally characterize and model the physical-chemical aging response of one to three DoD material(s), dependent on complexity of mechanism. - Intermediate delivery of compact lifetime predictive models to the DoD customer. - Validate the most promising tin whisker mitigation methods in actual operating environments.			
Accomplishments/Planned Programs Subtotals	17.889	18.765	17.256

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

1. Transition of technologies developed by the Joint DoD/DOE Munitions Technology Program are tracked and documented. In FY 2015 there were over 50 transitions to DoD weapons programs and personnel.
2. Attendance and technical interactions at the semiannual meetings of the eight Technology Coordinating Groups (TCGs) are tracked and documented.
3. Laboratory Five-Year Plans are prepared, evaluated, and analyzed by management and technical staff.
4. TCG Chairmen's Annual Assessments for each TCG are critically reviewed by the Technical Advisory Committee (TAC) to determine progress, validate transition plans, and verify relevance of each project.
5. Project progress toward goals and milestones is assessed at each biannual TCG meeting and critically reviewed annually by the TAC.
6. Annual technical reports, papers, and presentations are tracked and documented.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	13.299	14.645	12.048	-	12.048	13.166	16.712	16.726	17.055	Continuing	Continuing
P328: *Science and Technology Analytic Assessments*	-	13.299	14.645	12.048	-	12.048	13.166	16.712	16.726	17.055	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) directly supports the development of innovative capabilities to meet the emerging threats in the diverse range of state and non-state actor's threats confronting the Unites States. These capabilities include: space and terrestrial-based indications and warnings systems, integrated and resilient Intelligence, Surveillance, Reconnaissance (ISR) platforms, strategic lift, long-range precision strike weapons, missile defense technologies, undersea systems, remotely operated vehicles and technologies, special operations forces, the Cyber Mission Force, ground systems, and others outlined in the 2015 National Military Strategy. The science and technology (S&T) analytic assessments performed under this budget item include the following activities:

- Technical threat assessments building on intelligence community products for identifying gaps in U.S. capability for critical threats.
- Independent assessment of critical capability and technology development.
- Architecture development and evaluation to develop new U.S. capability.
- Development of strategic analytic tools enabling the analysis and evaluation of critical capability and technology development.
- Qualitative analysis of potential new technology and concepts to address capability gaps and counter emerging threat technologies.

Due to the complexity of these challenges, the process for developing and executing these analytic assessments span fiscal years and may have multiple phases. The emerging nature of the problem sets makes identification of studies beyond the budget year unlikely. Typically, the ratios of quick reaction studies, strategic analysis, and development of analytic tools will be roughly 30/50/20 percent. The first step in the process is to quickly assess gaps and options to fill those gaps; second, produce detailed analysis quantifying key attributes of the challenge, assess options, and provide an operational value assessment; and finally, develop analytic tools to help understanding of complex and longer term challenges. Implementation of this process could span multiple years causing the portfolio to cascade from year to year with each effort moving through the phases of study, experiment, and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603288D8Z *I Science and Technology (S&T) Analytic Assessments*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	12.000	14.645	11.531	-	11.531
Current President's Budget	13.299	14.645	12.048	-	12.048
Total Adjustments	1.299	0.000	0.517	-	0.517
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.393	-			
• Realignment for Higher Priority Programs	0.000	0.000	0.610	-	0.610
• FY15 Reprog. for Cancelled Account	-0.005	-	-	-	-
• Other Reprogrammings	1.697	-	-	-	-
• Economic Assumptions	-	-	-0.093	-	-0.093

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*	Project (Number/Name) P328 / *Science and Technology Analytic Assessments*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P328: *Science and Technology Analytic Assessments*	-	13.299	14.645	12.048	-	12.048	13.166	16.712	16.726	17.055	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) directly supports the development of innovative capabilities to meet the emerging threats in the diverse range of state and non-state actor's threats confronting the Unites States. These capabilities include: space and terrestrial-based indications and warnings systems, integrated and resilient Intelligence, Surveillance, Reconnaissance (ISR) platforms, strategic lift, long-range precision strike weapons, missile defense technologies, undersea systems, remotely operated vehicles and technologies, special operations forces, the Cyber Mission Force, ground systems, and others outlined in the 2015 National Military Strategy. The science and technology (S&T) analytic assessments performed under this budget item include the following activities:

- Technical threat assessments building on intelligence community products for identifying gaps in U.S. capability for critical threats.
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Due to the complexity of these challenges, the process for developing and executing these analytic assessments span fiscal years and may have multiple phases. The emerging nature of the problem sets makes identification of studies beyond the budget year unlikely. Typically, the ratios of quick reaction studies, strategic analysis, and development of analytic tools will be roughly 30/50/20 percent. The first step in the process is to quickly assess gaps and options to fill those gaps; second, produce detailed analysis quantifying key attributes of the challenge, assess options, and provide an operational value assessment; and finally, develop analytic tools to help understanding of complex and longer term challenges. Implementation of this process could span multiple years causing the portfolio to cascade from year to year with each effort moving through the phases of study, experiment, and evaluation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Science and Technology Analytic Assessments	13.299	14.645	12.048
Description: Science and Technology Analytic Assessments supports the development of innovative capabilities to meet the emerging threats in the diverse range of state and non-state actor's threats confronting the Unites States. These capabilities include: space and terrestrial-based indications and warnings systems, integrated and resilient Intelligence, Surveillance, Reconnaissance (ISR) platforms, strategic lift, long-range precision strike weapons, missile defense technologies, undersea systems, remotely operated vehicles and technologies, special operations forces, the Cyber Mission Force, ground systems, and others outlined in the 2015 National Military Strategy.			
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*	**Project (Number/Name)** P328 / *Science and Technology Analytic Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
In an effort to grow a balanced program, the ratio of quick reaction studies, strategic analysis, and analytic tool development was 33/52/15 percent. The activities in FY 2015 were more heavily weighted towards studies which will later mature into development of analytic tools. In general, the following activities were executed: Quick Reaction Studies: - Quick Reaction Analytic efforts responding to critical questions related to vulnerabilities of developing advanced threat missiles, options for Electronic Warfare (EW) capability applied to air and missile defense, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), particularly related to resilience of space capability, and capabilities originating from undersea. The following quick reaction studies were completed in FY15. Strategic Analysis: - Analyzed the distributed electronic warfare techniques for stand-off, stand-in and escort jamming. - Evaluated the emerging operations-focused electronic warfare concepts. - Analytical prototype of a RF-photonic front end receiver for real-time wideband sensing. - Assessed the stand-in jamming platform effectiveness and survivability in a counter-A2/AD mission. - Identified the capabilities needed for and faced by electronic warfare after 2025. - Determined the impact of quantum radar electronic protection against electronic attack. - Provided system and technology assessment for warfare from under the sea. - Assessed Operations and technology for defense against hypersonic weapons. - Assessed options for counter Signal Intelligence Operational Tasking Authority (SIGINT) and counter ISR. - Assessed viable options for development of an electronic attack countermeasure against a high priority ballistic missile threat. - Assessed options for an electronic attack against a high priority surface naval engagement. - Independently assessed proposed Low Cost Missile Defense interceptor to mitigate program risk and cost and to inform future program acquisition decisions. - Assessed Multi-Axis/Multi-Threat Raids against U.S. Naval and land based assets. - Assessed vulnerability for a passive kill chain. - Assessed architecture of EW-cyber effects. - Analyzed architecture for resilient C4ISR capability. Analytic Tools: - Developed analytic tools to inform and evaluate new technologies' potential to counter emerging threats and exploit adversary vulnerabilities from air, land, sea, and space domains. - Developed a reconfigurable airborne multi-band radar test bed designed to emulate the seekers of emerging threat missile systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*	**Project (Number/Name)** P328 / *Science and Technology Analytic Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Developed an analytic framework to assess next generation electronic warfare capability for both air and surface based kill chains. - Developed capability improvement architecture and experimental concepts for assured tactical communications. - Developed an analytic framework to assess architecture and sub-elements for countering situational awareness. ***FY 2016 Plans:*** In an effort to grow a balanced program, the planned ratio of quick reaction studies, strategic analysis, and analytic tool development will be 30/50/20 percent. The activities in FY 2015 were more heavily weighted towards studies which will later mature into development of analytic tools. In general, the following activities will be executed: Quick Reaction Studies: - Quick Reaction Analytic efforts responding to critical questions related to vulnerabilities to developing missiles, options for electronic warfare capability applied to missile defense, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), ground combat, and undersea engagements. Strategic Analysis: - Quantify distributed electronic warfare capabilities achievable in an Integrated Air Defense Systems (IADS) region. - Identify future threat detection and identification capabilities for future electronic support systems. - Generation of techniques for proactive offensive electronic warfare. - System and technology assessments for surface and sub-surface warfare. - Continue with the independent assessment of proposed Low Cost Missile Defense interceptor to mitigate program risk and cost, and to inform future program acquisition decisions. - Complete the assessment of Multi-Axis/Multi-Threat Raids against U.S. Naval and land based assets. - Assess U.S. land based defense against a cruise missile raid. - Assess counters to Unmanned Aerial Vehicle (UAV) threat capability. - Assess options for protection of airborne high value assets (HVAs) Analytic Tools: - Development of analytic tools to inform and evaluate new technologies' potential to counter emerging threats and exploit adversary vulnerabilities from air, land, sea, and space domains. - Completion of a reconfigurable airborne multi-band radar test bed designed to emulate the seekers of emerging threat missile systems. - Engineering development of a next generation electronic warfare capability for both air and surface based kill chains. - Evaluation of capability improvement architecture prototype for assured tactical communications.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*	**Project (Number/Name)** P328 / *Science and Technology Analytic Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Development of analytic tools to assess and underpin capabilities used in war gaming. ***FY 2017 Plans:*** FY 2017 Plans: In order to accomplish a balanced program, the target ratios of quick reaction studies, strategic analysis, and analytic tool development is planned to be 30/50/20 percent. Accordingly, the following activities are planned for FY 2017: Quick Reaction Studies: - Quick Reaction Analytic efforts responding to critical questions related to vulnerabilities to developing missiles, options for electronic warfare capability applied to missile defense, Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR), ground combat, and undersea engagements. Strategic Analysis: - Evaluation of EW vulnerabilities and countermeasures for land combat - Analysis of options for area denial capability - Quantify distributed electronic warfare capabilities achievable in an Integrated Air Defense Systems (IADS) region. - Identify future threat detection and identification capabilities for future electronic support systems. - Generation of techniques for proactive offensive electronic warfare. - Experimental data collection applied to a wider range of ISR capabilities. - System and technology assessments for surface and sub-surface warfare. - Evaluate options for a U.S. land based defense against a cruise missile raid. - Evaluate architecture options for countering Unmanned Aerial Vehicles (UAVs). - Evaluate efficacy of passive systems and counters to passive systems. Analytic Tools: - Development of analytic tools to inform and evaluate new technologies' potential to counter emerging threats and exploit adversary vulnerabilities from air, land, sea, and space domains. - Continued development of a next generation electronic warfare capability for both air and surface based kill chains. - Continued development of an analytic framework to assess architecture and sub-elements for countering situational awareness. - Continue testing and data collection of the reconfigurable airborne multi-band radar test bed.			
Accomplishments/Planned Programs Subtotals	13.299	14.645	12.048

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603288D8Z / *Science and Technology (S&T) Analytic Assessments*	**Project (Number/Name)** P328 / *Science and Technology Analytic Assessments*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Critical gaps in U. S. capability are identified.
- Gaps in U. S. technology development are identified.
- New architectures and evaluation criteria for developing U. S. capability are identified.
- Analytic tools to evaluate new technologies' potential to mitigate and counter emerging threats and exploit adversary vulnerabilities are developed.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	48.760	50.030	57.020	-	57.020	56.870	56.845	57.632	58.763	Continuing	Continuing
P329: *Advanced Innovative Analysis and Concepts*	0.000	48.760	50.030	57.020	-	57.020	56.870	56.845	57.632	58.763	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Strategic Capabilities Office (SCO) conducts analysis in support of ongoing efforts to shape and counter emerging threats, with special emphasis on: innovative and architecture-level concepts, cross-Service and cross-Defense/Intelligence concepts, red-teaming, and on a case-by-case basis, research and development projects to demonstrate concept. SCO identifies, analyzes, and accelerates the development, demonstration, and transition of selected capabilities to shape and counter emerging threats, and to improve U.S. security posture. In a partnership endeavor across the Office of the Secretary of Defense (OSD), Joint Staff, Combatant Commands (CCMDs), the Services, the Intelligence Community (IC), and other U.S. Government agencies, SCO combines capability innovation with concepts of operation and information management to develop novel, high-leverage approaches to address pressing national security challenges. SCO conducts projects on accelerated timelines, at any classification or access level.

The Advanced Innovative Analysis and Concepts Program Element supports development, studies, analysis, and demonstration of integrated concepts and prototypes, analysis in support of ongoing efforts to shape and counter emerging threats, cross-Service and cross-Defense/Intelligence concepts, and red-teaming. Projects focus on proving component and subsystem maturity prior to integration in major systems, and may involve risk reduction initiatives. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	50.000	59.830	57.654	-	57.654
Current President's Budget	48.760	50.030	57.020	-	57.020
Total Adjustments	-1.240	-9.800	-0.634	-	-0.634
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-9.800			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.221	-			
• Other Internal Baseline Adjustment	-	-	-0.193	-	-0.193
• FY15 Reprog. for Cancelled Account	-0.019	-	-	-	-
• Economic Assumptions	-	-	-0.441	-	-0.441

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603289D8Z *I Advanced Innovative Analysis and Concepts*

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	Project (Number/Name) P329 / *Advanced Innovative Analysis and Concepts*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P329: *Advanced Innovative Analysis and Concepts*	0.000	48.760	50.030	57.020	-	57.020	56.870	56.845	57.632	58.763	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Strategic Capabilities Office (SCO) conducts analysis in support of ongoing efforts to shape and counter emerging threats, with special emphasis on: innovative and architecture-level concepts, cross-Service and cross-Defense/Intelligence concepts, red-teaming, and on a case-by-case basis, research and development projects to demonstrate concept. SCO identifies, analyzes, and accelerates the development, demonstration, and transition of selected capabilities to shape and counter emerging threats, and to improve U.S. security posture. In a partnership endeavor across the Office of the Secretary of Defense (OSD), Joint Staff, Combatant Commands (CCMDs), the Services, the Intelligence Community (IC), and other U.S. Government agencies, SCO combines capability innovation with concepts of operation and information management to develop novel, high-leverage approaches to address pressing national security challenges. SCO conducts projects on accelerated timelines, at any classification or access level.

The Advanced Innovative Analysis and Concepts Program Element supports development, studies, analysis, and demonstration of integrated concepts and prototypes, analysis in support of ongoing efforts to shape and counter emerging threats, cross-Service and cross-Defense/Intelligence concepts, and red-teaming. Projects focus on proving component and subsystem maturity prior to integration in major systems, and may involve risk reduction initiatives. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Low-Cost Payloads	14.284	-	-
Description: The Low-Cost Payloads project leverages existing platforms and payloads to deliver near-term innovative capabilities to Combatant Commanders. SCO repurposes existing systems by developing alternative Concepts of Employment (CONEMP) and Tactics, Techniques, and Procedures (TTP) for their employment by the warfighter. Concepts that provide capability improvements to Combatant Commanders are identified for accelerated prototype demonstration, and worked as joint projects with the Services to speed transition time for rapid fielding. Low-Cost Payloads will leverage low cost, commercial, and often low technology options that do not conform to the typical DoD acquisition business model, but have the potential to disrupt and change warfighting capabilities by avoiding or creating technological surprise. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. The Low-Cost Payloads project is transitioning to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2016 as part of the Unmanned Aerial Vehicle Payloads project.			
FY 2015 Accomplishments:			
• Conducted proof-of-concept design, manufacturing, and demonstration of prototype systems			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	**Project (Number/Name)** P329 / *Advanced Innovative Analysis and Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Completed operationally relevant demonstrations of the PERDIX Micro UAV and initial MALD-X payload at Exercise Northern Edge in June of 2015. • Performed technical, operational, and red team analysis to compare results of demonstrations to mission analysis predictions. This provides an assessment of capabilities' potential to counter strategic adversaries and improve the U.S. security posture.			
Title: Command and Control of the Information Environment ***Description:*** The Command and Control of the Information Environment (C2IE) project provides Combatant Commands, Services, Agencies, and Department of Defense leadership the ability to detect, monitor, understand, and act in the information environment. The C2IE project leverages commercial and other existing software tools to enable dynamic understanding of the information environment. C2IE will improve the warfighters ability to sense, understand, and visualize the information environment, and collaboratively plan and execute activities that contribute to U.S. Government shaping efforts. Due to the nature of this project, specific applications and detailed plans are available at a higher classification level. The Command and Control of the Information Environment project will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. ***FY 2015 Accomplishments:*** • Completed Command and Control of the Information Environment (C2IE) requirements analysis and Capability Definition Package (CDP) with Joint Staff J6. • Developed task coordination framework and collaborative mission management capability. • Tested analytic capabilities in support of two DoD exercises and one operation in the U.S Pacific Command Area of Responsibility. • Demonstrated collaborative mission management capabilities and provided hands on familiarization to 81 personnel in the U.S. Pacific Command. ***FY 2016 Plans:*** • Develop a System Engineering Plan (SEP) and integrate all C2IE component capabilities. • Finalize data and network architectures and deploy C2IE software on multiple platforms. • Establish a test and evaluation platform & lab for C2IE • Provide an integrated set of analytic and visualization tools on an information Common Operational Picture (iCOP) for improved situational awareness. • Conduct two capability demonstrations, and three additional familiarization engagements for various Combatant Commanders (CCMDs).	7.468	10.000	-
Title: Sea Dragon ***Description:*** A cost-effective disruptive offensive capability will be demonstrated by integrating an existing weapon system with an existing Navy platform. Project includes analysis, prototyping, and experimentation. Due to the nature of these projects,	4.660	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	**Project (Number/Name)** P329 / *Advanced Innovative Analysis and Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
specific applications and detailed plans are available at a higher classification level. The Sea Dragon project is transitioning to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2016. ***FY 2015 Accomplishments:*** - Commenced Phase 0 Analysis and Planning, which included: - Analyzed risk areas and defined appropriate measures for risk reduction. - Established top level system engineering requirements. - Prepared and developed modeling and simulation in support of preliminary system design and static ground testing. - Established Process Teams for Safety, System Engineering, Testing and Management. - Established an Integrated Master Schedule and Integrated Management Plan. - Improved processing speed to reduce time latency from sensor to shooter for off board targeting of maritime targets.			
Title: Sea Mob ***Description:*** SCO, in partnership with the Office of Naval Research (ONR), is developing a group of Unmanned Surface Vehicles (USVs) capable of cooperative swarming behaviors. This project will demonstrate the ability to generate common situational awareness among USVs and conduct coordinated dynamic planning required for sustaining cooperative behaviors. Sea Mob and ONR are working closely together on USV swarm development activities, building on a series of successively more complex demonstrations planned over the next several years to advance the capabilities and prove utility of swarming USVs for multiple missions. This project is funded within the Advanced Innovative Technologies Program Element 0604250D8Z FY 2016 and FY 2017. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. The Sea Mob project is transitioning to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2016. ***FY 2015 Accomplishments:*** - Johns Hopkins University Applied Physics Lab (JHUAPL), NASA Jet Propulsion Lab (JPL), Pennsylvania State University Applied Research Lab (PSUARL) and ONR assessed, selected and developed hardware and software solutions for USV swarm subsystems, including sensors, navigation, communications, and autonomy. - Naval Surface Warfare Center, Carderock Division, Combatant Craft Division (NSWCCD-CCD) acquired, modified and equipped a prototype USV, including all subsystems. - NSWCCD-CCD conducted testing and evaluation of this USV to reduce risk in preparation for planned long range demonstrations in FY 2016 and FY 2017.	5.499	-	-
Title: Alternative Strike ***Description:*** The Alternative Strike demonstration integrates existing weapons, launch platforms, and command and control structures in novel ways to quickly provide the Combatant Commanders with critical multi-mission capabilities. This project will	-	6.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	**Project (Number/Name)** P329 / *Advanced Innovative Analysis and Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
demonstrate the feasibility and utility of launching existing/modified weapons from existing launch platforms. This project will retire risks associated with cross platform integration to enable transition of new weapon/system combinations to service partners. The FY2016 effort will perform preliminary weapon/launch platform integration studies. The Alternative Strike project will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2016 Plans:*** • Assess Size, Weight, Area, and Power (SWAP) and environmental factors for new concepts and refine concepts based on assessments • Conduct preliminary design of required platform or weapon modifications • Develop interfaces for weapons/platform integration • Develop and assess concepts of operation for new concepts • Finalize program plans for FY2017–FY2020 development and demonstration			
Title: Strike-Ex ***Description:*** The Strike-Ex project leverages existing strike capabilities and develops alternative Concepts of Employment (CONEMP) and Tactics, Techniques, and Procedures (TTP) to deliver near-term innovative strike capabilities to Combatant Commanders. Due to the nature of this project, specific applications and detailed plans are available at a higher classification level. The Strike-Ex project will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. ***FY 2016 Plans:*** • Conduct preliminary design and systems engineering activities in support of system architecture, hardware design and platform integration requirements. • Study Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF) implications for Strike-Ex. • Continue modeling and simulation efforts to better inform CONOPS development. • Develop operationally-relevant proof-of-principle demonstrations to anchor modeling and simulation performance results.	-	4.000	-
Title: Third Eye ***Description:*** Third Eye is a data architecture that leverages existing and emerging sensors to provide real-time tracking and targeting for multi-Service strike weapons. The project will enhance tracking against hard targets in denied environments and maintain ability to securely communicate with these sensors in real-time. SCO will integrate Third Eye-participating sensors with existing Service architectures to provide a low-cost, survivable real-time tracking and targeting capability to supplement existing	-	2.500	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	**Project (Number/Name)** P329 / *Advanced Innovative Analysis and Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
sensors. Due to the classified nature of this project, specific applications and detailed plans are available at a higher classification level. The Third Eye project will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. ***FY 2016 Plans:*** • Convert and Test J-Series Messages to Common Message Format on the Integrated Broadcast Service (IBS). • Continue to refine low latency fusion algorithms. • Complete three Upstream Data Fusion (UDF) demonstrations/evaluations of improved timeliness. • Continue to develop updates to Mission Planning for Weapons/Tactical Employment guides for using off board sensors. • Conduct four spirals of Clutch Shot demonstrations. • Conduct site testing of special collection sensor. • Complete architecture engineering analysis. • Transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017.			
Title: Sea Stalker ***Description:*** SCO will leverage existing low cost, persistent maritime platforms to offer Combatant Commanders (CCMDs) deterrence options during a crisis. The Sea Stalker project seeks to retire the risk of platform and payload integration to provide an immediate, flexible capability. The project includes modeling, analysis, prototyping, and testing. The intended end-state is a prototype system that retires all risks necessary to allow transition to Navy partners. Due to the nature of the project, specific applications and detailed plans are available at a higher classification level. The Sea Stalker project will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. ***FY 2016 Plans:*** • Develop integrated design for platform/payload concept and perform critical design review. • Conduct proof-of-concept demonstration of maritime platforms in an operationally relevant scenario. • Finalize payload mission analysis. • Perform feasibility tests to quantify the capability to counter strategic threats.	-	4.000	-
Title: High-Fidelity Analysis and Concept Generation ***Description:*** The Strategic Capabilities Office (SCO) conducts analysis to identify and accelerate the development, demonstration, and transition of potentially game-changing capabilities to shape and counter emerging threats and improve U.S. security posture. All innovative concepts developed within SCO must first undergo a phase of thorough analysis before moving forward to become a project. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.	16.849	23.530	57.020

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603289D8Z / *Advanced Innovative Analysis and Concepts*	**Project (Number/Name)** P329 / *Advanced Innovative Analysis and Concepts*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: • Conducted mission analysis, initial prototyping, and established service partnerships for four separate projects that will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017: Alternative Strike, Strike-Ex, Third Eye, and Sea Stalker. • Conducted Technical and Operational exchange meetings with CCMDs to ensure appropriate emphasis on value added benefit of recommended alternatives. ***FY 2016 Plans:*** • Continue to innovate in partnership with Services Program Offices and CCMDs to identify game-changing uses of existing systems and technologies. ***FY 2017 Plans:*** • Continue to innovate in partnership with Services Program Offices and CCMDs to identify game-changing uses of existing systems and technologies.			
Accomplishments/Planned Programs Subtotals	48.760	50.030	57.020

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics are specific to each Advanced Innovative Analysis and Concepts effort and include measures identified in the management approach, Statement of Work (SOW), and Period of Performance (POP). In addition, completions and successes are monitored against schedules and deliverables stated in the initiative's management approach. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603375D8Z / *Technology Innovation*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	10.000	25.000	39.923	-	39.923	59.917	79.919	99.921	99.921	Continuing	Continuing
P375: *Technology Innovation*	-	10.000	25.000	39.923	-	39.923	59.917	79.919	99.921	99.921	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) has a long history of technological breakthroughs and innovations originating from within the Department. In order to sustain technological superiority, the Department must take advantage of the rapid evolution of emerging commercial technologies that, when integrated with military systems and novel concepts of operation, will be a source of battlefield advantage.

The Program is focused on developing space-based Intelligence, Surveillance, and Reconnaissance (ISR), Artificial Intelligence-driven Geospatial Intelligence (GEOINT), and Fix-Find-Finish-Exploit-Assess (F3EA) into an integrated capability for defeating threats posed by nuclear-capable, mobile missile - a problem set often plagued by sparse data. Our approach is composed of three innovated building blocks: 1) Machine learning techniques applied to commercial GEOINT for automated anomaly and change detection throughout the country of interest - crucial element for enhancing our indications and warnings required for precision strikes; 2) Machine-Human collaboration architecture to accelerate the F3EA joint forces targeting and decision-making cycle; and 3) Autonomous weaponeering demonstration - Exercise Black Cloud for timely precision strikes to hold mobile missile systems at risk. These innovation blocks will serve as the foundation for all the investment selection criteria for the pilot program.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	10.000	25.000	39.923	-	39.923
Total Adjustments	10.000	25.000	39.923	-	39.923
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	25.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Technology Innovation	-	-	40.000	-	40.000
• Other Reprogrammings	10.000	-	-	-	-
• Economic Assumptions	-	-	-0.077	-	-0.077

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603375D8Z / *Technology Innovation*	Project (Number/Name) P375 / *Technology Innovation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P375: *Technology Innovation*	-	10.000	25.000	39.923	-	39.923	59.917	79.919	99.921	99.921	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) has a long history of technological breakthroughs and innovations originating from within the Department. In order to sustain technological superiority, the Department must take advantage of the rapid evolution of emerging commercial technologies that, when integrated with military systems and novel concepts of operation, will be a source of battlefield advantage.

The Program is focused on developing space-based Intelligence, Surveillance, and Reconnaissance (ISR), Artificial Intelligence-driven Geospatial Intelligence (GEOINT), and Fix-Find-Finish-Exploit-Assess (F3EA) into an integrated capability for defeating threats posed by nuclear-capable, mobile missile - a problem set often plagued by sparse data. Our approach is composed of three innovated building blocks: 1) Machine learning techniques applied to commercial GEOINT for automated anomaly and change detection throughout the country of interest - crucial element for enhancing our indications and warnings required for precision strikes; 2) Machine-Human collaboration architecture to accelerate the F3EA joint forces targeting and decision-making cycle; and 3) Autonomous weaponeering demonstration - Exercise Black Cloud for timely precision strikes to hold mobile missile systems at risk. These innovation blocks will serve as the foundation for all the investment selection criteria for the pilot program.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Technology Innovation	10.000	25.000	39.923
Description: The purpose of this project is to explore innovative technologies and to enable the efficient incorporation of technologies, into the weapons systems and operations capabilities.			
FY 2015 Accomplishments: The Technology Innovation Program is on track to conduct a demonstration in December 2016. When tailored with deep algorithms, the state-of-the-art Graphic Processing Units (GPUs) opened up the option to perform on-board processing, conducting object detection and target recognition directly on the Unmanned Aerial Vehicle (UAV) in real-time, thereby eliminating the need to send dense Synthetic Aperture Radar (SAR) or Full Range Motion Video (FMV) to downlink stations for further processing. In addition, the detected objects can be used to populate coordinate mensuration and weaponeering models for on-board processing of fix and finish solutions in real-time. This approach will be a game changer by drastically decreasing the execution timeline of sensor-to-shooter from hours to possibly minutes.			
FY 2016 Plans: Identify and assess technologies and products of potential benefit to DoD. Modify and demonstrate technologies to facilitate meeting DoD needs.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603375D8Z / *Technology Innovation*	**Project (Number/Name)** P375 / *Technology Innovation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The PE will seek to broaden DoD's access to innovative companies and technologies for application beyond the intelligence community to the wider DoD mission set. ***FY 2017 Plans:*** Identify and assess technologies and products of potential benefit to DoD. Modify and demonstrate technologies to facilitate meeting DoD needs. The PE will seek to broaden DoD's access to innovative companies and technologies for application beyond the intelligence community to the wider DoD mission set.			
Accomplishments/Planned Programs Subtotals	10.000	25.000	39.923

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603527D8Z / *Retract Larch*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	39.320	0.000	108.430	181.977	-	181.977	171.275	162.373	161.745	164.901	Continuing	Continuing
P527: *Retract Larch*	39.320	0.000	108.430	181.977	-	181.977	171.275	162.373	161.745	164.901	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	118.666	184.000	-	184.000
Current President's Budget	0.000	108.430	181.977	-	181.977
Total Adjustments	0.000	-10.236	-2.023	-	-2.023
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• FFRDC Reductions	-	-0.236	-	-	-
• Economic Assumptions Adjustment	-	-	-1.408	-	-1.408
• Realignment for Higher Priorities	-	-	-0.615	-	-0.615

Change Summary Explanation

FY17 realignments and other reductions were in support of Departmental efficiencies and economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603527D8Z / *Retract Larch*	Project (Number/Name) P527 / *Retract Larch*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P527: *Retract Larch*	39.320	0.000	108.430	181.977	-	181.977	171.275	162.373	161.745	164.901	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Retarct Larch	0.000	108.430	181.977	0.000	181.977
Description: Not applicable. Information Classified ***FY 2015 Accomplishments:*** Funds not requested. ***FY 2016 Plans:*** Not applicable. Information is Classified. ***FY 2017 Base Plans:*** Information is classified. ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.000	108.430	181.977	0.000	181.977

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not Applicable. Classified

E. Performance Metrics

Not Applicable. Classified

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	10.757	30.879	22.030	-	22.030	14.402	13.003	12.192	12.432	Continuing	Continuing
P619: *Joint Electronic Advanced Technology*	-	10.757	17.466	10.992	-	10.992	11.657	12.226	12.192	12.432	Continuing	Continuing
P244: *Advanced EW Technology Maturation Project*	-	0.000	6.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
P245: *EW Enterprise Exploration and Innovation*	0.000	0.000	7.413	11.038	-	11.038	2.745	0.777	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

To counter the United States' historic technological advantage, nation-states and terrorists are increasingly developing asymmetric capabilities that are enabled by advanced commercial electronic components and devices that have become globally available. These asymmetric threats range from terrorist-employed improvised devices to dedicated military systems that can be used in ways that diminish our technological advantage in conflicts with nation-states. The rate at which new threats are appearing is accelerating and they are appearing quicker than traditional Department of Defense (DoD) requirements and acquisition processes can respond.

The use of asymmetric technologies is well understood by both nation-states and terrorists. Terrorists have attacked air and ground forces using improvised explosive devices based on commercial electronic components and easily transportable man portable air defense systems, and they are increasingly employing commercially-available unmanned air systems to target U.S. and allies' forces. Concurrently, nation-states are developing and proliferating cruise and ballistic missiles, Integrated Air Defense Systems (IADS), and unmanned air systems with advanced capabilities to pose significant threats to our forces.

The dire consequences of technological surprise and the accelerating rate of appearance of new threats highlight the need to rapidly develop and field innovative Electronic Warfare (EW) and EW/Cyber capabilities that can neutralize threats in fiscally and temporally responsive ways. We must, however, also concurrently develop innovative technologies and approaches to give us asymmetric advantages over potential adversaries.

To proactively address the accelerating threat environment and restore the United States' technological overmatch capabilities, the Joint Electronic Advanced Technology (JEAT) program focuses on technological innovation to accelerate the pace of EW capabilities development. JEAT specifically explores and assesses new and innovative approaches to rapidly mitigate advanced threats by integrating advanced commercial and military off-the-shelf technologies in innovative ways and rapidly demonstrating innovative technological capabilities that can be inserted into the Services' Programs of Record with significantly reduced risk. JEAT efforts are based on three pillars (Experimentation/Demonstration, Advanced Technology Development/Verification, and Innovative Technology Exploration) and supported and enabled by JEAT's EW Enterprise Collaboration and Planning efforts.

In FY 2016, the EW Enterprise Exploration and Innovation Project (P245) was added by the Department to accelerate the fielding of vitally needed EW capabilities. This four-year effort has two foci: (1) accelerating the development of innovative countermeasures to new classes of advanced threats that are being developed and

fielded by potential adversaries and (2) providing innovative capabilities to counter anti-access/area denial threats posed by countries possessing modern, advanced IADS. Work area in area (1) will enable earlier fielding of warfighting essential capabilities through direct technology transitions to ongoing Air Force and Navy Programs of Record (Advanced Airborne Countermeasures Development and Advanced Defensive Countermeasures Development). Work in area (2) will explore a variety of non-kinetic technologies, tools, and techniques to include converged EW/Cyber approaches and battle management optimization and visualization technologies (Non-Kinetic Battle Management and Visualization Technology Development, Advanced EW and EW/Cyber Exploration and Development, and Ultra Wideband Receiver Development).

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	10.949	43.966	23.446	-	23.446
Current President's Budget	10.757	30.879	22.030	-	22.030
Total Adjustments	-0.192	-13.087	-1.416	-	-1.416
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-13.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.188	-			
• Realignment for Higher Priority Programs	-	-	-1.246	-	-1.246
• FY15 Reprog. for Cancelled Account	-0.004	-	-	-	-
• FFRDC Reduction	-	-0.087	-	-	-
• Economic Assumptions	-	-	-0.170	-	-0.170

Change Summary Explanation

FY 2017 realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / *Joint Electronic Advanced Technology*	Project (Number/Name) P619 / *Joint Electronic Advanced Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P619: *Joint Electronic Advanced Technology*	-	10.757	17.466	10.992	-	10.992	11.657	12.226	12.192	12.432	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates means to (1) rapidly mitigate new asymmetric electronic threats that have been enabled by the global proliferation of electronic components and devices with advanced capabilities and (2) guarantee U.S. technological overmatch capabilities through the development of new asymmetric capabilities. Laboratory efforts and field experimentation venues focus on fully understanding current capabilities and exploring, demonstrating, and assessing new and innovative capabilities. Developmental efforts seek to produce new capabilities by integrating advanced commercial and military off-the-shelf technologies in innovative ways not being explored by the Services. Laboratory/field experimentation and developmental efforts are focused on demonstrating new capabilities that can be rapidly inserted into the Services' Programs of Record with reduced risk. Oversight efforts within the Electronic Warfare (EW) and Countermeasures Office (EW&C) in the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)) assess and ensure coordination of all Departmental EW Research and Development (R&D) efforts and coordinate national and international efforts in emerging Information Operations and EW/Cyber Convergence topics. Four efforts comprise this project: Experimentation/ Demonstration, Advanced Technology Development/Verification, Innovative Technology Exploration, and EW Enterprise Collaboration and Planning.

Experimentation/Demonstration (E/D):

E/D explores and demonstrates technologies and approaches to address compelling warfighting issues. The first E/D venue, Vigilant Hammer (VH), is a recurring multi-year, multi-agency, live, virtual, and constructive field experimentation venue of increasing complexity and difficulty focused on advancing the state of the art for the detection, classification, geolocation and prosecution of electromagnetic signals of interest using DoD and national resources. Modeled after Joint Electronic Advanced Technology's (JEAT) highly successful BLACK DART, Trident Spectre, and Rotorcraft Aircraft Survivability Equipment (RASE) Experiment venues, VH includes both scripted and free play scenarios intended to give participants an opportunity to explore the efficacy of existing and new capabilities and approaches to engage emerging Electromagnetic Spectrum (EMS) threats. Additional venues addressing emerging concerns (e.g., advanced electro-optical and millimeter wave threats) will be added in future years.

Advanced Technology Development/Verification (ATD/V):

ATD/V research efforts to mature and assess emerging technologies that address compelling EW and converged EW/Cyber warfighting needs. JEAT's ongoing ATD/V effort, Distributed Electronic Effects Development (DEED), is a laboratory and developmental venue that matures and assesses emerging EW and converged EW/Cyber technologies to enable, for example, more effective coordination of sensor and electronic attack capabilities to enable multi-point, collaborative EW/Cyber capabilities. DEED specifically identifies and pairs synergistic technologies to develop systems with capabilities that are greater than the sum of the individual parts.

Innovative Technology Exploration (ITE):

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P619 / *Joint Electronic Advanced Technology*

ITE conducts analyses and studies of emerging asymmetric threats for the Director, EW&C. Past work includes support to Office of the Secretary of Defense's (OSD) Aircraft Survivability Equipment Joint Analysis Team and the Helicopter Survivability Task Force, which resulted in rapid technology investments by DoD to address crucial warfighting needs. Current efforts are focused on advanced analytic studies of link budgets associated with addressing highly advanced agile threats.

EW Enterprise Collaboration and Planning (EW C&P):

EW C&P supports all activities of the Director, EW&C related to the selection, organization, oversight, and coordination of all EW and EW-related R&D across DoD and oversees and ensures proper coordination and collaboration between OSD and the Joint Staff, Combatant Commands, and the Services on an extensive variety of EW-related activities within DoD and world-wide. EW C&P identifies, assesses, and develops recommendations to address EW-related threat trends impacting sensor, seeker, communications, and battle management technologies and countermeasures to these threats; provides programmatic and budget review and recommendations; and provides decision support to the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD(AT&L)) on Programs of Record including technology availability and maturity, Critical Program Information standards, Foreign Disclosure, and Technical Signals Requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Experimentation/Demonstration (E/D)	4.061	8.400	4.019

Description: The Vigilant Hammer (VH) series of multi-year, multi-agency, live, virtual and constructive field experimentation venues explores and assesses technologies that seek to more effectively sense, classify, geolocate, prosecute, and assess attack effects against modern, agile and cognitive signals in dense and highly complex signals environments. Leveraging JEAT's history of conducting highly successful and cost effective experiments, VH gages the collective ability of DoD and the Intelligence Community to provide the essential robust, adaptive, effective networks of sensing and electronic attack capabilities through the use of collaborative, distributed sets of electronic systems. Detailed planning for a second E/D venue focusing on another EW-related high priority area will begin in FY 2016.

FY 2015 Accomplishments:
VH 1 was conducted in March of FY 2015 and the final report was completed in December 2015. Assessment of VH 1 results guided planning efforts for VH 2, which started in 4Q FY 2015.

FY 2016 Plans:
VH 2 will be conducted in May of FY 2016 with a final report to be produced within a couple of months after the event. Building on the signals detection, classification, geolocation and prosecution emphases of VH 1, more active attack methodologies are being added to the event. All means of spectrum sensing and attack will be included to address a much larger community than VH 1 as well as a first-ever characterization of our national ability to remotely assess in near real time wide area spectrum attack effectiveness on adversary systems. Assessment of VH 2 results will guide planning efforts for VH 3, which will begin in 4Q FY 2016.

FY 2017 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P619 / *Joint Electronic Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Building on the results of earlier VH events, VH 3 will increase electromagnetic battlespace complexity and demonstrate a wider variety both EW and Radio Frequency-enabled digital EW tools and techniques. VH 3 will also seek to involve greater numbers and varieties of operational users to increase both developer and operational community awareness of spectrum challenges and opportunities.			
Title: Advanced Technology Development/Verification (ATD/V) ***Description:*** ATD/V research efforts mature and assess emerging technologies to address compelling EW and converged EW/Cyber warfighting needs. These efforts utilize JEAT's Distributed Electronic Effects Development (DEED) laboratory and developmental environment which focuses on identifying and integrating multiple advanced technologies to synergistically create effects that are far greater than the sum of the constituent systems and identifying innovative approaches to accomplish military objectives to more cost effectively utilize the spectrum. ***FY 2015 Accomplishments:*** In FY 2015, DEED explored new and innovative technologies and approaches to deliver multi-point, collaborative EW and EW/Cyber capabilities to warfighters through more effective coordination of distributed (primarily Unmanned Aerial Vehicle (UAV) based) sensor and electronic attack capabilities. Capability integration and effect quantification will ultimately prepare products for evaluation in venues like VH. DEED also maintains access to a small fleet of UAVs for the purpose of experimentation with distributed EW payloads when they are mature enough for open air experimentation following integration in the DEED laboratory. ***FY 2016 Plans:*** FY 2016 continues FY 2015 efforts with an emphasis on the creation of techniques and approaches that can be employed from distributed systems (primarily UAV based), specifically focusing on the development of multi-point Digital Radio Frequency Memory-like techniques that can be synergistically/cooperatively employed by UAVs. Efforts will focus on the development and demonstration of effects by combining two or more existing components/technologies to produce new and unique capabilities with greater warfighting value than the sum of the parts. Integration into prototypical systems and quantification of the benefits of the DEED's controlled laboratory environment will also occur with the goal of preparing products for evaluation in venues like VH. ***FY 2017 Plans:*** Build on FY 2016 efforts, FY 2017 efforts will use DEED and other available laboratories to explore the power of delivering spectrum effects from distributed networks of devices. Promising candidates will be evaluated for integration within appropriate field demonstrable systems (with a focus on UAV integration) for demonstrations in VH 3.	1.527	3.253	1.511
Title: Innovative Technology Exploration (ITE) ***Description:*** ITE supports the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)), and the Director, EW&C, through studies and analyses of emerging asymmetric threats. Past efforts include supporting the Aircraft Survivability	1.494	1.950	1.478

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P619 / *Joint Electronic Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Equipment Joint Analysis Team and the Helicopter Survivability Task Force, both of which resulted in significant strategic technology investments by the DoD. The current ongoing ITE effort is Adaptive/Asymmetric Technology (A/AT). ***FY 2015 Accomplishments:*** FY 2015 efforts focused on analysis of alternative Courses of Action (COAs) related to packaging and deploying advanced EW technologies being developed in related development efforts. Evaluation of complex spectrum environments, system-to-system interactions, and link budget analyses impacting EW effects employment on advanced threats. ***FY 2016 Plans:*** FY 2016 efforts will focus on analysis of alternative COAs employing advanced, adaptive and cognitive EW technologies emerging in commercial data communications, radar, and other advanced spectrum domains previously dominated by DoD. The evaluation of complex spectrum environments, system-to-system interactions; link budget analyses; size, weight and power analysis; and other relevant analytic studies will be accomplished under this effort, including issues related to modeling of many advanced jammers operating in the same airspace. ***FY 2017 Plans:*** FY 2017 efforts will focus on expanding and assessing FY 2016-developed alternative COAs for employing advanced, adaptive and cognitive EW technologies emerging in commercial data communications, radar, and other advanced spectrum domains previously dominated by DoD. The evaluation of complex spectrum environments; system-to-system interactions; link budget analyses; size, weight and power analysis; and issues related to modeling of many advanced jammers operating in the same airspace will continue, with a focus of developing demonstrable prototypes for use in VH 3.			
Title: EW Enterprise Collaboration and Planning (EW C&P) ***Description:*** This effort supports the EW&C Director's management, oversight, and coordination of the plethora of EMS warfare related activities for ASD(R&E). It includes maintaining cognizance to all EW capabilities development activities worldwide; overseeing the extensive number and variety of EW-related R&D activities within DoD; exploring new and innovative EMS technologies and approaches; coordinating Departmental EW-related R&D, programs, protocols, and policy; analyzing requisite technologies and efforts; ensuring intelligence requirements for EMS warfare-related efforts are met; managing all EMS development and operational interfaces across DoD and with international partners; and reporting relevant information both within the DoD and to Congress and other external groups as necessary. ***FY 2015 Accomplishments:*** In FY 2015, EW C&P efforts produced the fifth of five Comprehensive EW Reports to Congress providing the consolidated status of EW, strategy and planning. EW gaps were evaluated and mitigating EW capabilities were identified and recommended as directed by Joint Chiefs of Staff /Joint Requirements and OSD/ATL in conjunction with Strategic Command/Joint Electronic	3.675	3.863	3.984

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P619 / *Joint Electronic Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Warfare Center, the Services, and Combatant Commands. Briefings and insights were presented to the Defense Science Board (DSB) on EW and EW C&P efforts assessing and defensing the DSB recommendations through the POM-review process resulted in funding for four new defensive countermeasure projects and the accelerated development of a new modular, reconfigurable technology that is being adopted by the U.S. Marine Corps. Efforts played a significant role in the development of chartering documents and organizational processes establishing the EW Executive Committee; provided oversight for the EW Community of Interest, JEAT programmatic efforts, and VH products; opened new interactions with the Intelligence Community at Senior levels with Defense Information Operations Cyber; advanced the priority of engineering level analysis and reporting from priority 17 to priority 3; stimulated a new Central Intelligence Group-directed study into Foreign Material Exploitation and Acquisition (FME/FMA); organized a new security portfolio for EW Special Access programs; advanced initiatives for the establishment vulnerability portfolios; and provided leadership of efforts to identify potential technological solutions to address Joint Urgent Operational Need SO-0010. ***FY 2016 Plans:*** FY 2016 efforts include analysis of alternative COAs for employing advanced, adaptive and cognitive EW technologies emerging in commercial data communications, radar, and other advanced spectrum domains previously dominated by DoD. Complex spectrum environments; system-to-system interactions; link budget analyses; size, weight and power analysis; and other relevant analytic studies will be assessed as part of this effort and include issues related to modeling of many advanced jammers operating in the same airspace. Plans and exploratory investigations will evolve to evaluate and harvest emerging concepts and technologies from the R&E Reliance Process and the EW Science and Technology Community of Interest Roadmap. Multi-platform, multi-aperture synchronization and control technologies, and software algorithms and associated autonomous control systems are expected to be among the initial focal concepts as well as investigations into robust command and control mechanisms with high reliability and strong anti-jam configurations and measuring data throughput requirements, enhanced fusion and geolocation mechanisms. EW C&P efforts will continue monitoring of evolving, ever-changing threats and alternative countermeasure technologies along with recurring annual reassessments of net progress vis-à-vis realized improvements in mission effectiveness. Analysis and coordination of national and international efforts addressing emerging Information Operations and EW/Cyber Convergence topics will also begin. ***FY 2017 Plans:*** FY 2017 efforts will focus on the development of a variety of new EW capabilities including distributed cooperative or coherent aperture techniques; battle management and visualization technologies for optimization of non-kinetic fires; asymmetric targeting technologies; passive system countermeasure techniques; and national technical means applications to EW. Efforts will also seek to advance imaging Infrared Countermeasures technologies and expand U.S.-Australia collaboration in EW/Cyber.			
Accomplishments/Planned Programs Subtotals	10.757	17.466	10.992

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P619 / *Joint Electronic Advanced Technology*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / *Joint Electronic Advanced Technology*	Project (Number/Name) P244 / *Advanced EW Technology Maturation Project*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P244: *Advanced EW Technology Maturation Project*	-	0.000	6.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Electronic Warfare (EW) Technology Maturation Project is a one-year effort to mature and demonstrate modular, distributed, configurable EW technologies and systems designs addressing U.S. Marine Corps (USMC) and U.S. Army warfighting requirements that will accelerate the fielding of advanced EW capabilities in the FY 2017 Intrepid Tiger II (IT2) Program of Record. This effort will develop and integrate capabilities to counter radar targets while mitigating blue-on-blue and co-site interference impacts into an existing communications jamming capability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced EW Technology Maturation Project	-	6.000	-

Description: Technologies demonstrated in this effort will be integrated into future USMC and U.S. Army precision EW system of systems architectures and will enable distributed, adaptive, and scalable counter-communications and counter-radar EW capabilities that are compliant with existing open architecture systems and net-centric architectures.

The architectural and battle management research in this effort will also inform USMC and U.S. Army EW developers on a wide variety of implementation options affecting collaborative, networked, multi-element system designs. These capabilities are envisioned to support combat and contingency operations throughout the world, and are anticipated to transition to the warfighter in IT2 and future U.S. Army and Joint Service programs.

FY 2016 Plans:

FY 2016 efforts focus on maturating technologies developed by Defense Advanced Research Projects Agency and the Services, to enable the integration of counter-radar electronic attack capabilities into existing counter-communications EW systems. The new capabilities developed in this effort will counter current and future radar threats, provide improved communications operational availability by adding a spectral “relocation” coordination capability and mitigate co-site interference on a mission by mission basis, utilizing dynamically reprogrammable channelized amplifiers and digital filters.

These objectives will be accomplished via the following:

- Identifying technology requirements needed to provide spectrum diverse capabilities from direct current to millimeter wave
- Developing / evaluating / integrating advanced transceiver technologies to include but not limited to digital Radio Frequency (RF) memory devices
- Developing / evaluating / integrating advanced modem and network technologies; including waveform transitions and policy based spectrum planning

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P244 / *Advanced EW Technology Maturation Project*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Developing / evaluating / integrating channelized, efficient amplifier technologies • Evaluating simultaneous transmit and receive antenna technologies and analog cancellers • Evaluating phased array antennas • Integrating digital interoperability compatibility by providing dual/tri-redundant data link functionality and spectrum relocation			
Accomplishments/Planned Programs Subtotals	-	6.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / *Joint Electronic Advanced Technology*	Project (Number/Name) P245 / *EW Enterprise Exploration and Innovation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P245: *EW Enterprise Exploration and Innovation*	0.000	0.000	7.413	11.038	-	11.038	2.745	0.777	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This four-year project, which begins in FY 2016, accelerates the development of innovative technologies to provide countermeasures to new classes of Electronic Warfare (EW) threats enabled by the global proliferation of advanced electronics technologies. New countermeasure capabilities are needed to address threats characterized by significantly expanded spectral and temporal coverage and resolution, increasingly complex and diverse waveforms, and have great agility. Countermeasures are needed for both emitting (e.g., radars and communications) and non-emitting (e.g., passive radars and sensors and weapon seekers) threat systems. Countermeasures are also needed to guarantee assured command and control and robust battle management capabilities in the face of advanced persistent electronic attacks by technologically advanced adversaries. Five efforts will be initiated in FY 2016 to address EW Enterprise Exploration and Innovation: Advanced Airborne Countermeasures Development, Advanced Defensive Countermeasures Development, Non-Kinetic Battle Management and Visualization Technology Development, Advanced EW and EW/Cyber Exploration/Development, and Ultra Wideband Receiver Development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Airborne Countermeasures Development	-	2.900	3.500
Description: This effort develops advanced countermeasures to protect airborne assets against a wide variety of increasingly sophisticated threat systems possessing expanded spectral and temporal coverage and resolution using complex and diverse waveforms and having significant agility. Efforts will specifically address advanced EW, sensor, and seeker threats involving Radio Frequency (RF) and/or electro-optical technologies. Integration of technology products within existing and developmental architectures will be guaranteed by close coordination with both warfighters and technology developers. ***FY 2016 Plans:*** FY 2016 efforts will begin development of countermeasures to a specific set of classified airborne threats. Devices developed in this effort will be designed to fit within the existing architectures and be compatible with existing and developmental operational constructs to enable earlier transitions to the warfighter. ***FY 2017 Plans:*** FY 2017 efforts will continue FY 2016 work with a focus on demonstrating developed countermeasures in relevant operational environments.			
Title: Advanced Defensive Countermeasures Development	-	1.500	2.000
Description: This effort develops advanced countermeasures to defend Naval assets against advanced threat weapons employing increasingly sophisticated and diverse RF and/or electro-optical seeker technologies. Integration of technology			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P245 / *EW Enterprise Exploration and Innovation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
products within existing and developmental architectures will be guaranteed by close coordination with both warfighters and technology developers. ***FY 2016 Plans:*** FY 2016 efforts will begin development of robust countermeasures to a new class of seeker threats employing increasingly sophisticated and diverse RF and/or electro-optical seeker technologies. Integration of technology products within existing and developmental architectures and concepts of operations will be guaranteed by close coordination with both warfighters and technology developed. ***FY 2017 Plans:*** FY 2017 efforts will continue FY 2016 work with a focus on demonstrating developed countermeasures in relevant operational environments.			
Title: Non-Kinetic Battle Management and Visualization Technology Development ***Description:*** Non-Kinetic Battle Management and Visualization Technology Development explores a variety of technologies to significantly increase the fidelity and level of control of Electromagnetic (EM) battlespace situational awareness, visualization and control technologies available to warfighters in Battle Management (BM) centers. Legacy BM tools, Intelligence Community capabilities and state-of-the-art data processing, display and visualization technologies will be leveraged to incorporate information from all EM battlespace sensor feeds, to include national assets, to develop the most advanced and realistic EM battlespace possible. ***FY 2016 Plans:*** FY 2016 will begin development of the next generation of EM battlespace situational awareness, visualization and control technologies. Hardware- and software-in-the-loop laboratory capabilities will be leveraged to the maximum extent to enable build-assess-improve cyclic capability growth. ***FY 2017 Plans:*** FY 2017 will continue development of the next generation of EM battlespace situational awareness, visualization and control technologies. Hardware- and software-in-the-loop laboratory capabilities will be leveraged to the maximum extent to enable build-assess-improve cyclic capability growth. Capabilities developed in this effort will be employed for analysis of environments and effects within VH3 with a focus on utilizing operational users and transitioning newly developed capabilities to these users.	-	2.100	1.266
Title: Advanced EW and EW/Cyber Exploration/Development ***Description:*** This task will work on access and payload capability for EMS-Cyberspace capability to achieve closed network access and effects against hard-to-reach targets in Anti-Access Area Denial (A2AD) environments. This initiative focuses on the continuum between EW effects such as jamming and Cyber effects to produce greater military impact against the adversary. This	-	0.413	1.740

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P245 / *EW Enterprise Exploration and Innovation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
effort will also incorporate algorithms, signal processing and techniques for increasing the viable standoff distance for prosecution, interrogation and disruption of adversary threats. ***FY 2016 Plans:*** FY 2016 will begin development of composite EW and Offensive Cyber Operations capabilities against A2AD threats, including advanced adversary weaponry, for employment on software-defined and reprogrammable transceivers. ***FY 2017 Plans:*** FY 2017 will continue development of composite EW and Offensive Cyber Operations capabilities against A2AD threats, including advanced adversary weaponry, for employment on software-defined and reprogrammable transceivers. Initial prototypes will be demonstrated in field experimental venues such as VH 3.			
Title: Ultra Wideband Receiver Development (UWBR) ***Description:*** UWBR will explore technologies to provide significantly greater instantaneous bandwidth with extreme sensitivity to enhance the detection, identification, classification, geolocation, and cueing of countermeasures against threat emitter systems that have increased spectral coverage, bandwidth, agility, and waveform diversity. A variety of innovative technologies will be explored, developed, and demonstrated in dense, extremely complex EM environments, possibly to include VH and/or subsequent JEAT E/D venues. ***FY 2016 Plans:*** FY 2016 efforts will focus on the acceleration of efforts to (1) develop chip-scale, hyper sensitive and ultra wide band receiver components, (2) develop algorithms and components to process the vast amounts of collected data, and (3) initially characterize system performance. Brassboard capability demonstrations in laboratory and/or field environments will be used to baseline and assess performance in increasingly complex EM environments. ***FY 2017 Plans:*** FY 2017 efforts will continue focus on the acceleration of efforts to (1) develop chip-scale, hyper sensitive and ultra wide band receiver components, (2) develop algorithms and components to process the vast amounts of collected data, and (3) initially characterize system performance. Brassboard capability demonstrations in laboratory and/or field environments will be used to baseline and assess performance in increasingly complex EM environments. Early prototype systems will be demonstrated in field experimental venues such as VH 3.	-	0.500	2.532
Accomplishments/Planned Programs Subtotals	-	7.413	11.038

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603618D8Z / *Joint Electronic Advanced Technology*	**Project (Number/Name)** P245 / *EW Enterprise Exploration and Innovation*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	484.441	116.234	132.258	148.184	-	148.184	115.975	117.047	119.153	124.494	Continuing	Continuing
P648: *Joint Capability Technology Demonstration (JCTD)*	484.441	116.234	132.258	148.184	-	148.184	115.975	117.047	119.153	124.494	Continuing	Continuing

Note

The Joint Capability Technology Demonstration (JCTD) Program's mission is to support the identification, development, and demonstration of forward looking concepts encompassing multi-domain technologies to satisfy Multi-Service and Combatant Commands (COCOMs) priorities. Seeking to explore the art of the possible through the use of rigorous prototyping and experimentation, the JCTD program engages the Interagency, International, and non-governmental partners to expand the Department of Defense's (DoD) access to innovation spawning from government, academia and industry. Focused on the core tenets of the Defense Innovation Initiative and Better Buying Power, the JCTD program serves as the vehicle for COCOMs and Services to address strategic priority areas that present significant risk and suffer from inadequate investment in the Department as identified by the Chairman's Gap Assessment, Quadrennial Defense Review, Strategic Defense Reviews and other senior level guidance.

These strategic priorities are the primary driver in the identification of JCTD projects which will be initiated in the following areas: Electromagnetic Spectrum Agility; Space Capability Resilience; Autonomous Systems and Asymmetric Force Application. The objective is to implement measures to maintain U.S. technological superiority across the range of military operations and counter emerging threats while providing effects at range, reducing the cost of operations, and allowing for the rapid insertion of new capabilities to achieve the desired effects within three to five years.

Going forward, JCTDs supporting the DoD's strategic priorities will tend to be longer and larger with increased emphasis on innovation, risk reduction, and affordability. Overall, we envision initiating fewer yet more strategically decisive JCTDs. JCTDs will continue to reinforce key partnerships across the operational and technical communities for expedited development, deployment, evaluation, and transition of capability solutions with the potential to address some of the most highly complex challenges of the Department. In addition, these JCTD partnerships will enable interdepartmental cooperation and capability development with the Departments of Homeland Security, State, Transportation, Energy, Justice, the National Aeronautics and Space Administration, among others.

A. Mission Description and Budget Item Justification

The value and impact of the JCTD program is to cost-effectively address the Department's strategic priorities to maintain U.S. technological superiority and counter emerging threats while promoting affordability and interoperability of Defense systems throughout all Pre-Engineering and Manufacturing Development (Pre-EMD) phases. In FY 2015, the JCTD Program successfully completed the demonstration and transition of several JCTD prototypes that fielded affordable and sustainable solutions to meet immediate operational warfighting needs.

Key values demonstrated by the JCTD program are:

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*

• The JCTD Program has a long history of providing enduring capabilities. See "Section D. Acquisition Strategy" for more details on transition.

• The JCTD Program delivers capabilities far quicker than the traditional DoD Planning, Programming, Budgeting, and Execution (PPBE) process. Recent examples include:

1. The Joint Extended Range Illumination Projectiles (JERIP) JCTD delivered 155 millimeter Infrared (IR) and Visual Light (VL) Illumination projectiles, which has allowed the warfighter to see as far as they can shoot and provides extended night time situational awareness in the counter insurgency Area of Operations. As a direct result of the JCTD, JERIP achieved Milestone C as an Army Acquisition Category III Program of Record (PoR), and was approved for full-rate production. The JCTD accelerated and increased this capability, resulting in a direct cost-savings of between $6.000 million-$10.000 million to the development effort.

2. In support of the Army Robotic Systems Joint Program Office, the Autonomous Mobility Applique Systems (AMAS) JCTD successfully developed, demonstrated and transitioned autonomous capabilities to the U.S. Army Route Clearance and Integration System PoR that will be incorporated into existing Tactical Wheeled Vehicle (TWV) PoRs. AMAS has completely changed the Army's future ground robotics plans and requirements and will have a lasting impact on future ground autonomous programs through the application of lessons learned and capability from the AMAS JCTD.

3. The High Speed Container Delivery System (HSCDS) JCTD developed a parachute system to offload up to eight Container Delivery System bundles at an elevation of 250 feet and 250 knots from C-130J and C-17 aircraft. This has significantly improved the accuracy of existing delivery systems while providing increased safety for the aircraft and friendly ground forces. HSCDS transitioned to the Army's Product Manager for Force Sustainment Systems, has been extensively used in Afghanistan and used to deliver humanitarian assistance to Yazidi people on Mount Sinjar, Iraq.

• The JCTD Program enables coalition cooperative development by leveraging partner nation expertise and resources; approximately one-fifth of JCTD projects involve some degree of participation from coalition partners. As a result of successful past collaborations, the program now enjoys routine interactions with the United Kingdom, Canada, Australia, and the Republic of Korea.

• The JCTD Program also enables development and execution of interdepartmental cooperation projects with the Department of Homeland Security, State, Transportation, and the National Aeronautics and Space Administration.

MEASURABLE OUTCOMES:

• JCTDs will demonstrate capability objectives within three to five years.
• The JCTD program will continue to achieve high transition rates. In FY 2015, 100 percent of completed JCTDs successfully transitioned. Seven of nine completed JCTDs transitioned to a new or existing Program(s) of Record, two of nine transitioned to fieldable-prototypes (residual capabilities) sustained by non-JCTD funds in direct support of operations in theater.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603648D8Z *I Joint Capability Technology Demonstration (JCTD)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	119.790	141.540	125.003	-	125.003
Current President's Budget	116.234	132.258	148.184	-	148.184
Total Adjustments	-3.556	-9.282	23.181	-	23.181
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-9.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.009	-			
• Baseline adjustments for higher priorities and requirements	-	-	24.058	-	24.058
• FY15 Reprog. for Cancelled Account	-0.047	-	-	-	-
• Other Reprogrammings	-0.500	-	-	-	-
• FFRDC	-	-0.282	-	-	-
• Economic Assumptions	-	-	-0.877	-	-0.877

Change Summary Explanation

The FY 2017 baseline adjustment of $23.207 million was added for COCOM support to include experimentation and prototyping activities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	Project (Number/Name) P648 / *Joint Capability Technology Demonstration (JCTD)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P648: *Joint Capability Technology Demonstration (JCTD)*	484.441	116.234	132.258	148.184	-	148.184	115.975	117.047	119.153	124.494	Continuing	Continuing

Note

The Joint Capability Technology Demonstration (JCTD) Program's mission is to support the identification, development, and demonstration of forward looking concepts encompassing multi-domain technologies to satisfy Multi-Service and Combatant Commands (COCOMs) priorities. Seeking to explore the art of the possible through the use of rigorous prototyping and experimentation, the JCTD program engages the Interagency, International, and non-governmental partners to expand the Department of Defense's (DoD) access to innovation spawning from government, academia and industry. Focused on the core tenets of the Defense Innovation Initiative and Better Buying Power, the JCTD program serves as the vehicle for COCOMs and Services to address strategic priority areas that present significant risk and suffer from inadequate investment in the Department as identified by the Chairman's Gap Assessment, Quadrennial Defense Review, Strategic Defense Reviews and other senior level guidance.

These strategic priorities are the primary driver in the identification of JCTD projects which will be initiated in the following areas: Electromagnetic Spectrum Agility; Space Capability Resilience; Autonomous Systems; and, Asymmetric Force Application. The objective is to implement measures to maintain U.S. technological superiority across the range of military operations and counter emerging threats while providing effects at range, reducing the cost of operations, and allowing for the rapid insertion of new capabilities to achieve the desired effects within three to five years.

Going forward, JCTDs supporting the DoD's strategic priorities will tend to be longer and larger with increased emphasis on innovation, risk reduction, and affordability. Overall, we envision initiating fewer yet more strategically decisive JCTDs. JCTDs will continue to reinforce key partnerships across the operational and technical communities for expedited development, deployment, evaluation, and transition of capability solutions with the potential to address some of the most highly complex challenges of the Department. In addition, these JCTD partnerships will enable interdepartmental cooperation and capability development with the Departments of Homeland Security, State, Transportation, Energy, Justice, and the National Aeronautics and Space Administration.

A. Mission Description and Budget Item Justification

The value and impact of the JCTD program is to cost-effectively address the Department's strategic priorities to maintain U.S. technological superiority and counter emerging threats while promoting affordability and interoperability of Defense systems throughout all Pre-Engineering and Manufacturing Development (Pre-EMD) phases. In FY 2015, the JCTD Program successfully completed the demonstration and transition of several JCTD prototypes that fielded affordable and sustainable solutions to meet immediate operational warfighting needs.

Key values demonstrated by the JCTD program are:

• The JCTD Program has a long history of providing enduring capabilities. See "Section D. Acquisition Strategy" for more details on transition.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

• The JCTD Program delivers capabilities far quicker than the traditional DoD Planning, Programming, Budgeting, and Execution (PPBE) process. Recent examples include:

1. The Joint Extended Range Illumination Projectiles (JERIP) JCTD delivered 155 millimeter Infrared (IR) and Visual Light (VL) Illumination projectiles, which has allowed the warfighter to see as far as they can shoot and provides extended night time situational awareness in the counter insurgency Area of Operations. As a direct result of the JCTD, JERIP achieved Milestone C as an Army Acquisition Category III Program of Record (PoR), and was approved for full-rate production. The JCTD accelerated and increased this capability, resulting in a direct cost-savings of between $6.000 million-$10.000 million to the development effort.

2. In support of the Army Robotic Systems Joint Program Office, the Autonomous Mobility Applique Systems (AMAS) JCTD successfully developed, demonstrated and transitioned autonomous capabilities to the U.S. Army Route Clearance and Integration System PoR that will be incorporated into existing Tactical Wheeled Vehicle (TWV) PoRs. AMAS has completely changed the Army's future ground robotics plans and requirements and will have a lasting impact on future ground autonomous programs through the application of lessons learned and capability from the AMAS JCTD.

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• The JCTD Program enables coalition cooperative development by leveraging partner nation expertise and resources; approximately one-fifth of JCTD projects involve some degree of participation from coalition partners. As a result of successful past collaborations, the program now enjoys routine interactions with the United Kingdom, Canada, Australia, and the Republic of Korea.

• The JCTD Program also enables development and execution of interdepartmental cooperation projects with the Department of Homeland Security, State, Transportation, and the National Aeronautics and Space Administration.

MEASURABLE OUTCOMES:

• JCTDs will demonstrate capability objectives within three to five years.
• The JCTD program will continue to achieve high transition rates. In FY 2015, 100 percent of completed JCTDs successfully transitioned. Seven of nine completed JCTDs transitioned to a new or existing Program(s) of Record, two of nine transitioned to fieldable-prototypes (residual capabilities) sustained by non-JCTD funds in direct support of operations in theater.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Anti-Jam Precision Guided Munitions (AJPGM)	5.900	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: AJPGM will enable precision navigation capability in severely degraded Global Positioning System (GPS) environments. AJPGM will also deliver low cost home-on-jam capability. Specifics related to technologies, current capability, and threats are classified. ***FY 2015 Accomplishments:*** Integrated sensor assemblies with surrogate weapon platforms. Conducted flight test technical demonstrations. Conducted flight test operational demonstrations using surrogate platforms. Completed a limited utility assessment based on demonstrations. Completed sensor integration with Joint Direct Attack Munitions and Small Diameter Bomb guided test vehicles and live weapon variants. Conducted technical demonstrations using inert weapon platforms. Conducted operational flight demonstrations with live weapons. Completed the utility assessment. Transitioned to Air Force Program Execution Office, Weapons, Program of Record. Completed the JCTD.			
Title: Advanced Weapons Enhanced by Submarine Unmanned Aerial System against Mobile targets (AWESUM) ***Description:*** AWESUM will deliver an undersea launched Unmanned Aerial System (UAS), optimized for deployment through existing submarine three inch countermeasure launcher, to perform targeting, Intelligence, Surveillance, and Reconnaissance (ISR), and the potential for limited attack capabilities. This effort will specifically address requirements from an Anti-Access/Anti-Denial perspective and the unique challenges to U.S. Forces. It will enhance the ability to find, fix, target, and track maritime targets to support standoff weapon engagements, provide targeting for long range torpedo engagements, enhance ISR and Battle Damage Assessment capabilities, and provide Special Operations support functions. ***FY 2015 Accomplishments:*** Finalized shipboard integration activities, increased UAS endurance and communications, and successfully conducted an at-sea Operational Demonstration of the capability. Transitioned the AWESUM capabilities to Navy Submarine Combat System Program Office (Program Manager, Ship - 425) and Undersea Integration Program Office (Program Manager, Warfare - 770) Programs of Record. Completed the JCTD.	2.875	-	-
Title: Dense Pack Access Retrieval and Transit (DPART) ***Description:*** DPART will demonstrate a hybrid powered material handling equipment that can selectively access twenty-foot equivalent unit (TEU) containers and an electric large wheeled vehicle system that omni-directionally moves them in confined spaces (including ships underway and land based facilities). The technology will allow the Department to rapidly and selectively access, project, reconstitute and redeploy flexible, scalable and tailorable joint forces and logistical support across the range of military operations. ***FY 2015 Accomplishments:***	2.011	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Completed the final Technical Demonstration and Operational Utility Assessment of the omni-directional hybrid (diesel and battery) Container-Lift and Maneuver System (C-LMS) that allowed the movement of TEU containers, and the electric powered Autonomous Naval Transport-Large Wheeled Vehicle system (ANT-LWV) that moved military large wheeled vehicles. Additionally, a Universal Remote Controller (URC) was developed and demonstrated that allowed the operator to control both systems via one source. The demonstrations validated that the systems can be operated aboard vessels in sea state three and can traverse 15 degree ramps while moored or underway. DPART plans to transition to the General Services Administration Schedule 56 and to existing Programs of Record such as within U.S Navy Military Sealift Command (MSC) (potentially Joint High Speed Vessel), U.S. Army Depots within Army Materiel Command, and ammunition depots within Joint Munitions Command. JCTD residuals will transition to one or more operational users such as U.S. Marine Corps Blount Island Command or MSC. Completed the JCTD.			
Title: Joint Operational Long Term Evolution Deployable Tactical Cellular System (JOLTED TACTICS) ***Description:*** JOLTED TACTICS will demonstrate a joint architecture for an interoperable, lightweight, portable, ground mobile, airborne, and/or maritime communications-on-demand packages to allow users to quickly establish secure (Sensitive But Unclassified (SBU) and Suite-B for classified) wireless Long Term Evolution (LTE) Line-of-Sight and Beyond-Line-Of-Sight networks anytime, anywhere with minimal training and equipment. ***FY 2015 Accomplishments:*** Completed the Suite-B Information Assurance Certification. Completed two Operational Demonstrations (including the Tigershark Unmanned Air Vehicle) and the Operational Utility Assessment. Transitioned the residual equipment to U.S. Special Operations Command. Delivered the JCTD Final Report and completed the JCTD.	1.700	-	-
Title: Mobility ***Description:*** Mobility allows the use of Commercial of the Shelf (COTS) mobile devices to wirelessly access multiple security domains using security enhanced thin-client applications and thick-client solutions in enterprise and expeditionary environments. Mobility will prototype a capability for classified and unclassified access on a single hand-held device with use of National Security Agency certified commercial cryptography. Access will be provided to mobile domains through various communications transports in enterprise and expeditionary environments. ***FY 2015 Accomplishments:*** Integrated key technologies, while obtaining security certifications and approvals, to operate thick-client COTS mobile devices on the unclassified Marine Corps Enterprise Network-Non-Secure Internet Protocol Router and on classified closed tactical networks. U.S. Central Command (USCENTCOM) with the U.S. Marine Corps (USMC) recognized early, the merit of the thick-client COTS technology deploying it with the 15th Marine Expeditionary Unit prior to a full operational assessment in support of real-world	1.400	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
operations within the USCENTCOM Area of Responsibility. USCENTCOM implemented the MobiKEY (Trademark) capability gaining access to USCENTCOM's unclassified government virtual network from open internet locations in the U.S., Europe, and Southwest Asia, while keeping the security protocols intact. An Operational Demonstration and Military Utility Assessment was conducted on both the thick-client COTS mobile devices and MobiKEY (thin-client COTS device), both were found to have military utility. Transitioned Mobility prototype technologies to USMC Programs of Record. Extended use of MobiKEY at USCENTCOM through June 2016. Completed the JCTD.			
Title: Signal Intelligence Derived Electromagnetic Spectrum (SDEST) ***Description:*** SDEST will leverage National Security Agency (NSA) modernization initiatives to deliver Electo-Magnetic Spectrum (EMS) Target Folders (TF) providing a comprehensive view of the environment. It will compile relevant EMS Object Models (OM) supporting Kinetic/Non-Kinetic targeting, utilizing data from across the Global Cryptologic Enterprise. SDEST uses Cloud, Public Key Infrastructure (PKI), Smart Data Tagging and Cyber-Pilot technologies to enable timely and legal extraction and dissemination. It will deliver OMs via Electromagnetic Space Analysis Center (E-Space) managed Secret Internet Protocol Router Network (SIPRNet) and Joint Worldwide Intelligence Communications System widget query capabilities, and develop subscription services tailored to user-specified criteria. ***FY 2015 Accomplishments:*** Incorporated Object Models and Target Folders utilizing cloud-based data processing and correlation, Smart Data Tagging, and PKI access on Joint World Wide Intelligence Communications System. Implemented a cross-domain solution to allow users access to SDEST on SIPRNet. Conducted an Operational Utility Assessment, transitioned SDEST capabilities to E-SPACE for operator use on both SIPRNet and JWICS. Completed the JCTD.	1.925	-	-
Title: Innovative Projects and Transition Support less than $1.000 Million ***Description:*** Provide resources for approved JCTD projects requiring less than $1.000 million for enhancements to support successful operational demonstrations. ***FY 2015 Accomplishments:*** - Smart Power Infrastructure Demo for Energy Reliability & Security (SPIDERS) a cyber-secure “smart” micro-grid with demand side management and integration of renewable energy and storage on military installations, in partnership with Department of Homeland Security and Department of Energy. The residual micro-grid system transitioned to the Naval Facilities Engineering Command (NAVFAC) Hawaii and Marine Corps Base Hawaii. - Joint Biological Decontamination System (JBADS), a biological decontamination system that employs an innovative closed-loop, hot/humid forced air technique to significantly decontaminate the exterior/interior of a fully encapsulated aircraft.	4.933	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Kestrel Eye, a very small, 25 kilogram class satellite that provides “good enough” 1.5 meter resolution and visible imagery. Imagery tasking and delivery is controlled directly by the Combatant Commander to ensure sufficient timelines for near real-time situational awareness and decision-making in the field. Army Program Executive Office Missiles & Space (PEO-M&S) will take on initial acquisition of Kestrel Eye spacecraft and the overall system. Kestrel Eye will transition to Program Executive Office, Intelligence and Electronic Warfare Systems (PEO-IEWS) for the longer term. - Unified Command and Control (UC2) provides network enclaves to allow operational commanders to manage cyber risk to their own mission without introducing risk to the Global Information Grid. UC2 provided key lessons learned for assured terrestrial transport to protect core Command and Control (C2) in Anti-Access/Area Denial environments and allows greater access to assured C2 for Component Commanders, Joint Task Forces, and functional component headquarters. Tactical Switching and Maritime Operations Centers will include UC2 to fulfill coalition communications requirements. Pacific Air Forces has indicated that it will leverage UC2 lessons learned to implement a future Commercial-Solutions-for-Classified for coalition/partner connectivity. - Regional Domain Awareness (RDA) demonstrates a standards-based unclassified framework for information sharing between U.S. government agencies and international partners. RDA Service Oriented Architecture software and related documentation has a targeted transition to Defense Information Systems Agency (DISA) Program Executive Office for Command and Control Multi-National Information Systems (MNIS)/DISA Development & Business Center, Enterprise-Wide Services Collaboration Branch. Additionally, one operational node was provided to U.S. Navy 6th Fleet. - Kinetic/Non-kinetic Integrated Force Effects (KNIFE) provides Combatant Commanders with four dimensional (4D) views of composite targeting effects that dynamically updates to inform strategic and operation decision-making in a compressed timeframe. KNIFE is available on the Joint Worldwide Intelligence Communications System. The transition target is the Integrated Strategic Planning and Analysis Network Global Adaptive Planning Collaborative Information Environment. - Arctic Collaborative Environment (ACE) is an open-access, web-based, Arctic regional and national decision-support system that integrates geo-referenced data from existing remote sensing assets. The ACE capability has transitioned to U.S. National Ice Center (USNIC) and University of Alaska Fairbanks (UAF) as an open source web service/application and is currently transitioning to Alaska Command, Joint Task Force Alaska. - Coalition Tactical Awareness and Response (CTAR) provides a highly mobile capability adaptable to austere operating environments to receive commercial satellite Synthetic Aperture Radar (SAR). CTAR produces value-added maritime vessel detection position reporting via Over The Horizon Gold (OTG) Message Transmission Format. This enables detection of "dark" vessels because they are not emitting electromagnetic radiation from radar or other electro-magnetic communications.			
Title: Combatant Commander (COCOM) Support, Transition Enabling and Strategic Project Operational Management	18.000	19.200	19.700
Description: This effort is comprised of three programs that support the entire JCTD Program, separate from the specific JCTD projects. The three programs are (1) Unified COCOM Direct Support, (2) JCTD Pre-Transition and (3) Program Integration Office for execution of select, classified projects. (1) COCOM Direct Support: The COCOMs are essential in specifying capability			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603648D8Z / *Joint Capability Technology Demonstration (JCTD)*	**Project (Number/Name)** P648 / *Joint Capability Technology Demonstration (JCTD)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
needs, project development, demonstration, assessment, and transition of JCTDs. The JCTD Program provides direct support to COCOMs, enabling the COCOMs to provide an on-site JCTD operational manager, typically one to two full-time equivalents (FTEs). (2) JCTD Pre-Transition: In some cases, Service or Agency partner transition funding is not available for one to two years following the JCTD assessment phase due to Service or Agency commitments. In such cases, where there is a clear transition and the need to sustain the capability for a short time prior to availability of Service or Agency transition funds, the JCTD Pre-Transition fund may be used to meet that need. (3) Program Integration Office: Executes a select number classified project in areas such as electronic miniaturization, electronic countermeasures, advanced mobile ad hoc network communications, space situational awareness (SSA) intelligence surveillance and reconnaissance (ISR), sensor platforms and communications, and persistence surveillance. ***FY 2015 Accomplishments:*** Provided COCOM direct participation to enable COCOM staff participation in developing and executing Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes while addressing the strategic priorities of the Department. Sustained selected projects until program of record funds are received. COCOM liaisons provided direct support and coordination for JCTD operational demonstrations and military utility assessments. Developed and executed projects selected as a result of the Technology Assessment Panels. Executed a limited number of classified projects. ***FY 2016 Plans:*** Continue to provide COCOM direct participation in developing and executing Pre-EMD prototypes. Develop and execute projects selected as a result of the Technology Assessment Panels. Sustain selected projects until Program of Record (POR) funds are received. Execute a limited number of classified projects. ***FY 2017 Plans:*** Continue to provide COCOM direct participation to enable COCOM staff participation in developing and executing Pre-EMD prototypes. Develop and execute projects selected as a result of the Technology Assessment Panels. Sustain selected projects until POR funds are received. Execute a limited number of classified projects.			
Title: Enabling Technologies (ET) ***Description:*** The ET fund is used to assess or mature emerging capabilities that support the initiation of a Pre-Engineering and Manufacturing Development (Pre-EMD) prototype. Emerging Technology investments are small, short (less than one year) efforts that may lead to a prototype, depending on the final assessment and determination of technical maturity. ***FY 2015 Accomplishments:*** Projects included:	7.000	5.000	5.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Improved three dimensional capabilities for synthetic aperture radar (SAR) and Light Detection and Ranging (LIDAR) airborne systems - A validated secure micro-digital data link prototype, sense and avoid algorithms for unmanned aerial systems - Multispectral analysis of unclassified satellite imagery in the Arctic Ocean - Tactical radiological and chemical sensing capabilities for Chemical, Biological, Radiation, Nuclear forces - Net-enabled jammer capability enhancement under the CERBERUS JCTD - Enhanced unmanned underwater vehicle (UUV) centric intelligence surveillance, and reconnaissance (ISR) solutions for command control anti-jam - A reconnaissance capability for various ports and piers, scanning infrared (IR) sensors to detect and track unmanned aerial vehicles at various ranges - Tunable modifications of wideband electronic warfare (EW) receivers - Combat identification (ID) capability by utilizing topological and multiple hypothesis track algorithms - Small satellite capability with mission specific optional payloads - A virtual enterprise node to interface with Joint Information Environment (JIE) and Real Time Mission Partner Environment ***FY 2016 Plans:*** Projects will continue to be used to assess or mature emerging capabilities that support the initiation of a Pre-Engineering and Manufacturing Development Prototypes. Selected efforts will be small, focused, and executable in less than one year and require a concrete deliverable prototype hardware and/or software, integrated subsystem or technology assessment report, etc. ETs will be derived from the Emerging Capability and Prototyping Technical Assessment Panels. ***FY 2017 Plans:*** Projects will continue to be used to assess or mature emerging capabilities that support the initiation of a Pre-Engineering and Manufacturing Development Prototypes. Selected efforts will be small, focused, and executable in less than one year and require a concrete deliverable prototype hardware and/or software, integrated subsystem or technology assessment report, etc. ETs will be derived from the Emerging Capability and Prototyping Technical Assessment Panels.			
Title: JCTD Concept Development/Pre-Engineering and Manufacturing Development (Pre-EMD) Prototypes	1.145	31.664	51.290
Description: The JCTD program will develop projects as Pre-EMD prototypes to address broader Defense strategic initiatives in areas such as Electromagnetic Spectrum Agility; Space Capability; Autonomy Systems and Multi-Domain Technologies; Countering Weapons of Mass Destruction; and Force Application. Selected projects will leverage networks within the global research and engineering enterprise to include government labs and integration facilities, depots, academia, as well as traditional and non-traditional providers. Prototypes will utilize best practices to satisfy joint and cross-cutting needs and the EC&P office will work with the Services to identify means to streamline prototype transition into the acquisition systems where appropriate.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: Selected prototypes in the areas of Electromagnetic Spectrum Agility; Space Capability Resilience; Autonomy Systems and Multi-Domain Technologies; Countering Weapons of Mass Destruction; and Force Application. ***FY 2016 Plans:*** Conduct advanced prototyping activities focusing on Asymmetric Force Application, Space Capability Resilience, Electromagnetic Spectrum Agility, and Autonomous Systems. Specific projects under final review include: development of an air-launched interceptor to defeat ballistic missiles and high value airborne assets; autonomous low cost cruise missiles to provide a suite of weapons to perform a variety of missions; low cost relays to provide beyond-line-of-sight communications capabilities were satellite communications and airspace have been denied; an affordable alternative to conventional cluster munitions needed to meet the requirements of the 2008 DoD Policy on Cluster Munitions and Unintended Harm to Civilians; and the use of networked swarms of autonomous unmanned air systems that can operate a variety of missions in environments with communications, sensing, and position navigation and timing (PNT). ***FY 2017 Plans:*** Conduct advanced prototyping activities focusing on Asymmetric Force Application, Space Capability Resilience, Electromagnetic Spectrum Agility, and Autonomous Systems. Specific activities may include continued integration, subsystem and system level demonstrations and assessments for multi-vehicle expendable platform/expendable payload concepts working collaboratively to deliver reconfigurable effects using non-traditional delivery methods, deployment of hybrid Radio Frequency-optical tactical communications and protected communications for small unmanned systems, automated and integrated space manufacturing capabilities, reconfigurable self-forming and self-healing space based communication networks, machine cognition to aid human task loading to deploy multiple platforms, sensors, and weapons in complex mission scenarios.			
Title: Joint Multi-Platform Advanced Combat Identification (JMAC)	2.000	2.000	0.500
Description: JMAC will provide government-owned software that can be integrated into any sensor or Command and Control (C2) system to provide real-time identification of air threats, including Unmanned Aerial Systems (UAS), cruise missiles, rotary wing, military jets, and general aviation. JMAC will be integrated into the National Capitol Region-Integrated Air Defense System (NCR-IADS) via upgrades to the Improved-Sentinel radar, the Next Generation Fire Control Radar (i.e. Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS)), the NCR-IADS network, and the Joint Air Defense Operations Center (JADOC). ***FY 2015 Accomplishments:*** Initiated development of NCR-IADS network architecture updates to support the new JMAC Combat Identification (CID) capability, preliminary Tactics Techniques and Procedures development, integration of JMAC software into the various sensor and C2			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
platforms, and expansion of the JMAC database to support NCR. Conducted Technical Demonstration One and preparing for Field Demonstration One at Black Dart exercise in 2015. ***FY 2016 Plans:*** Refine messaging architecture; develop stop, stare, and track mode interface; continue algorithm refinement and integrate sidecar processors. Integrate the Enhanced Regional Situation Awareness (ERSA) sensor to address Counter-Unmanned Air Systems problem in the National Capitol Region. Conduct Field Demo 2 and 3. Develop system integration and assessment plans. Refine concept of employment and tactics, techniques, and procedures. ***FY 2017 Plans:*** Conduct multiple technical and operational demonstrations to ensure successful integration of software and test identification reliability of the algorithm. Begin transition of JMAC capability into the NCR-IADS Program of Record. Complete the JCTD.			
Title: Low Cost Missile Defeat (LCMD) ***Description:*** Low Cost Missile Defeat (LCMD) is a ballistic missile defense system designed to counter current and emerging Weapons of Mass Destruction (WMD) and Anti-Access/Area Denial (A2/AD) threats. LCMD program execution has been structured using a building block approach; the FY2015 step was a technology demonstration effort under the Deputy Assistant Secretary of Defense, Emerging Capability & Prototyping (DASD (EC&P)) to accelerate technology maturation. The Concept of Operations (CONOPS) for the system has been formulated to integrate LCMD into the existing National Ballistic Missile Defense (BMD) architecture and will prioritize the use of existing components and systems already fielded. LCMD is not designed as a replacement to existing BMD systems, but rather as a lower cost complementary/augmentative component to forward-deployed BMD assets. The LCMD capability will augment current BMD systems and mitigate threat vulnerabilities to U.S. personnel and strategic assets. ***FY 2015 Accomplishments:*** System Design, Performance and Cost/Value Trade Studies were conducted according to the LCMD Analysis Plan to refine and validate the system concept and assess the maturity of the required technology. High fidelity simulations and engineering analyses were developed to characterize detailed mission performance, integration interfaces with existing BMD infrastructure, and the system's ability to address validated capability gaps. In addition, the maturity of the three critical technology areas, booster design, seeker design, and thrust-vector control design was advanced through additional detailed design work, coupon and component level testing. A detailed production unit cost analysis was conducted to validate that the LCMD missile met the goal of less than $1.000 million per round. The studies concluded the LCMD concept presents a promising approach to lowering threat ballistic missile engagement costs. ***FY 2016 Plans:***	14.000	18.000	50.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The project will produce detailed designs for a LCMD prototype as well as the key interfaces to the BMD test infrastructure necessary to support a full-scale flight demonstration. In addition, high fidelity mission and architecture analyses will be conducted to continue to refine the concept. Pending successful reviews and development, future phases of the project will fabricate prototype interceptors in a demonstration to engage realistic threat targets. ***FY 2017 Plans:*** The project will continue to complete detailed designs for the LCMD prototype and progress to fabrication of critical and long lead components. Integration, assembly, and development testing will be conducted as well leading up to a Critical Design Review (CDR) for the prototype demonstration system. Pending successful development and reviews, the project will initiate fabrication, assembly and testing of flight demonstration prototypes.			
Title: Military Application of the Space Environment (MASE) ***Description:*** MASE prototype demonstrations mature space environment technology to improve combat operations. The prototype will provide weapons system specific visualizations that will be integrated into Operational Plans and Tactics, Techniques, and Procedures as decision aids to assess their utility for mission operations. Products will be evaluated using quantitative standard measures of performance, effectiveness, and outcome against theater operational requirements. A leave behind capability will provide residual capability at the conclusion of the prototype demonstration while a program of record is established. ***FY 2015 Accomplishments:*** Determined user tool requirements and software identification and integration efforts. Identified visualization tools for coverage areas while integrating comprehensive and empirical weather data. Worked an extensive software reuse effort to determine which software tools could be used to develop application tools for various high frequency propagation applications. ***FY 2016 Plans:*** Conduct end-to-end system/mission engineering to include sensor-to-shooter data flow/work flow, component technologies (model, applications and system effects), interfaces, and data exchanges. Generate user friendly mission planning tool with multiple effects and vetted graphical product suite, sensor laydown and types of data. Conduct multiple demonstrations. ***FY 2017 Plans:*** Finish end-to-end system/mission engineering and development of mission planning tool. Conduct final demonstration. Transition to Air Force Space Command for an extensive period of testing. Once the phenomenology is tested and well understood, it will transition to Combat Air Forces in Pacific Command. Complete the JCTD.	4.100	2.750	2.150
Title: Port Improvement via Exigent Repair (PIER)	2.358	2.244	1.544

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: PIER will deliver a dynamic, agile, cost effective (non-military construction) expeditionary engineering solution to rapidly repair damaged or degraded ports to a minimum level of serviceability after an attack or natural disaster. Agility is achieved through a smaller footprint, commercial off-the-shelf infusion, and quick reaction of theater-based repair assets (e.g. pre-packaged, pre-positioned). The intent of PIER is to assure continued logistics resiliency and freedom for our U.S. Forces to maneuver and conduct agile strategic sealift and logistics. PIER will allow the Department to address the Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facility, and Policy (DOTMLPF+P) concerns about its ability to conduct rapid port damage repair. ***FY 2015 Accomplishments:*** Conducted engineering design and validated construction materials and techniques for substructure repair: pile jacketing, section splicing, pile bridging, and expedient footings. Conducted two Technical Demonstrations and one Limited Operational Utility Assessment. These pile repair technologies allow for the primary foundation of ports to be restored. The plan is to transition to the U.S. Army (USA) and Defense Logistics Agency (DLA). ***FY 2016 Plans:*** Design and validate superstructure technologies: pile capacity upgrade, pile bracing, pile cap repair, beam replacement, beam and cap upgrade. Conduct two Technical Demonstrations and one Limited Operational Utility Assessment. These technologies allow for secondary components to strengthen the superstructure of the ports, and plan to transition to the USA and DLA. ***FY 2017 Plans:*** Design and validate technologies to repair deck craters and holes and over-bridging of gaps. Conduct two Technical Demonstrations and one Limited Operational Utility Assessment. Transition components to the U.S. Army, U.S. Navy and Defense Logistics Agency (DLA). Complete the JCTD.			
Title: Small Satellite Communications Network (SSCN) ***Description:*** SSCN provides an adaptive, self-healing, full-mesh network for assured communications, using a proliferated constellations of low-earth orbit small satellites and advanced software defined radios. ***FY 2015 Accomplishments:*** Conducted Preliminary Design Review and Critical Design Review. Down selected to three vendors for which proposals were solicited. ***FY 2016 Plans:***	5.000	14.000	5.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Begin ground testing of selected designs. Down-select to a single design and begin final development and plan for execution of an on-orbit test. ***FY 2017 Plans:*** Finish ground testing of selected designs. Conduct on-orbit test with single design and final demonstration. The classified user will continue to use the system until it is no longer functional to explore large small satellites constellations for utility, resilience, reconstitution, and technology adaptation. Complete project.			
Title: Low Power Module (LPM) ***Description:*** Emerging Capability & Prototyping is combining efforts with Navy in developing a low-power modular counter-electro-optical-infra red (C/EO-IR) sensor capability to counter intelligence, reconnaissance, surveillance and targeting (ISRT) systems. (Details are Classified) ***FY 2015 Accomplishments:*** Developed concept of operations (CONOP) and associated tactics, techniques and procedures (TTPs). (Details are Classified) ***FY 2016 Plans:*** Conduct effects testing and operational plan (OPLAN) analyses. (Details are Classified)	0.950	1.100	-
Title: Ravenscraig ***Description:*** Ravenscraig will provide technical and operational characterization and countermeasures for a class of threat signals. (Details are Classified) ***FY 2015 Accomplishments:*** Conducted phase II testing with controlled platform. (Details are Classified) ***FY 2016 Plans:*** Continue development and demonstration. Conduct phase III testing. (Details are Classified) ***FY 2017 Plans:*** Funds additional enhancements, features and capabilities for experimentation/demonstration. (Details are Classified)	9.000	15.000	3.000
Title: Salty Siren ***Description:*** Salty Siren will develop an indications and warning capability for countering Anti-Access/Area-Denial (A2/AD) missions. (Details are Classified) ***FY 2015 Accomplishments:***	1.000	1.000	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Refined and tested the engineering reference design to include a notional communication support package. (Details are Classified) ***FY 2016 Plans:*** Operationalize the field unit and conduct end-to-end acceptance testing. (Details are Classified)			
Title: Wasabi ***Description:*** Wasabi will produce a real-time common operational picture of adversary missile and space activity. (Details are Classified) ***FY 2015 Accomplishments:*** Designed data integration and processing infrastructure. (Details are Classified) ***FY 2016 Plans:*** Implement rule sets to enable collaboration with coalition partners. (Details are Classified)	4.200	4.000	-
Title: Analytics-based Tactical Data Fusion (ATDF) ***Description:*** The ATDF system is a hardware agnostic software package that provides real-time multi-sensor target tracking across the entire battle space enhancing air and missile defense as well as anti-access area denial in a low-cost package. It is adaptable across multiple platforms and usable across the military forces of the United States, its allies and its coalition partners. Through its real-time, multi-sensor fusion system, ATDF provides targeting and fire-control capabilities over an extended range to virtually every element in the battle space including aircraft, naval vessels of all sizes, and even ground units. ***FY 2015 Accomplishments:*** Successfully completed evaluation testing and successfully tested with Cooperative Engagement Capabilities. Installed in USS George Washington. Participated in Trident Warrior 15 and Talisman Saber 15. Results indicated a significant increase in track length, and a reduction in track numbers as well as a fire-control quality fusion of raw sensor feeds as well as Link16, Intelligence Broadcasting System, General Command and Control System-Maritime, Joint Range Extension Application Protocol, and Air Defense System Integrator. ATDF is targeted to transition to Navy Program Manager, Aircraft 231 (E2 Hawkeye) and the Multifunction Information Distribution System (MIDS)-Program Office (MPO) PMO/PMW 101 with the goal of integrating the ATDF into the Multifunction Information Distribution System-Joint Tactical Radio System upgrade.	2.137	-	-
Title: Paramount ***Description:*** Paramount Prototype is an electronic countermeasure system designed to address specific threats to U.S. Forces. The Paramount effort delivers a Size/Weight and Power (SWaP) assessment, laboratory Electromagnetic Interference/	10.000	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Compatibility (EMI/EMC) analysis, and final Engineering Manufacturing Design (EMD) drawings of a verified and validated system. (Details are Classified) ***FY 2015 Accomplishments:*** Completed Size/Weight and Power assessment and component laboratory EMC/EMI analysis. Conducted site analysis for system deployment and drafted concept of operations (CONOP) and system requirement document. (Details are Classified)			
Title: India Science and Technology Focus Area ***Description:*** The India Science and Technology (S&T) Focus Area is designed to deepen and streamline defense cooperation between the U.S. and India. By sharing research resources, capabilities, and expertise, the United States and India can jointly develop technological innovations needed to enable our defense industrial bases to support our militaries now and in the future. Further, development of vibrant S&T cooperation is a key step in building an enduring partnership. ***FY 2015 Accomplishments:*** Identified topic areas for cooperative S&T including autonomy, cognitive science, and directed energy science. Example projects include: Improving Cognitive & Artificial Cognition Models; Testing, Evaluation, Verification, and Validation for Autonomous Systems; Small, Intelligent Autonomous System for Situational Awareness; High Altitude Fatigue Management and Performance Sustainment; Experimental and Computational Studies of Blast & Blunt Traumatic Brain Injury; Cognitive Tools for Target Detection System; Atmospheric Propagation of High Energy Lasers; Bio-Effects of Laser and High-Power Microwave Sources; and Advanced Cathode Research for Accelerator Applications. ***FY 2016 Plans:*** Continue to develop and execute cooperative S&T projects initiated in FY 2015. Additional cooperative S&T areas targeted include: munitions development, advanced manufacturing, micro-power grids, and other identified project areas. ***FY 2017 Plans:*** Continue to widen, deepen and streamline defense S&T cooperation between the U.S. and India.	10.000	10.000	10.000
Title: Low Cost Attritable Airframe Technology (LCAAT) ***Description:*** LCAAT will develop and demonstrate technologies that enable rapid design, manufacturing, test and deployment of very low cost (essentially expendable) airframes. The strategic objective is to challenge the cost paradigm associated with current airframe manufacturing. LCAAT will conclude with a demonstration of an aircraft capable of 1000 nautical mile flight range and costing less than $3.00 million. This will be realized through a number of innovative prototyping and experimentation approaches that include new manufacturing technologies, very low cost life cycle control measures in the airframe design (i.e. reliability as needed, modelling and simulation for advance performance testing, etc). The effort will also include use of Engineered Resilient	4.600	6.300	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Systems (ERS) technology to develop fixed-wing trade space analysis tools to allow for rapid optimization and manufacturing of future systems. ***FY 2015 Accomplishments:*** Program planning and execution meetings were conducted. Identified airframe trade space analysis tool requirements and initiated development. ***FY 2016 Plans:*** Demonstration of suitable manufacturing technique to control production and life cycle costs, development and demonstration of ERS system to inform trade space of airframe design choices, prototype initial airframe subsystems and test for reliability. Prototype final airframe and integration subsystem components to ready for flight demonstration. Conduct flight demonstration, validate ERS design trade space analysis tool			
Accomplishments/Planned Programs Subtotals	116.234	132.258	148.184

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Successful JCTDs can transition to acquisition via one of several methods:

- The JCTD addresses a documented capability gap in an existing Program of Record (POR). The existing POR can acquire, further develop, sustain, and provide the capability under existing program documentation.
- The capabilities address capability gaps that naturally fit with an existing POR, but program documentation addressing the new capabilities does not exist. In these cases, existing POR documentation (such as the Capabilities Development Document or Capabilities Production Document) is revised to include the new capabilities from the JCTD, and the JCTD capabilities transition to the POR.
- The capabilities address a current operational need without requiring POR changes. In these cases, the JCTD capabilities may transition directly to operational use, with sustainment (operations and maintenance) funding arranged through the gaining command.
- The capabilities may be widely applicable commodity products, useful to many commands. In these cases, the commodity products listed on General Services Administration schedule, and made available for purchase by any commands needing the capability, using procurement funds.
- Results of JCTD are used to inform the research and engineering, acquisition, or requirements process.
- JCTD demonstrates the art-of-possible and results are put on the shelf to meet future threats and operational needs.

E. Performance Metrics

Strategic Goals Supported:

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- Develop and demonstrate a prototype that fills a capability gap
- Demonstrate a capability to address a DoD key strategic gap
- Develop a prototype that informs the acquisition and requirements process
- Independent Assessment Capability
- Successful Military Utility Assessment (MUA)

The majority of funding from this program element is forwarded to the Services/Defense Agencies that execute the individual JCTD projects.

MEASURABLE OUTCOMES:

• JCTDs will demonstrate capability objectives within 24-48 months:

• The JCTD program will continue to achieve high transition rates. In FY 2015, 100 percent of completed JCTDs successfully transitioned. Seven of nine completed JCTDs transitioned to a new or existing Program(s) of Record, two of nine transitioned to fieldable-prototypes (residual capabilities) sustained by non-JCTD funds in direct support of operations in theater.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603662D8Z / *Networked Communications Capability*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	5.967	9.331	-	9.331	12.718	7.822	2.934	2.992	Continuing	Continuing
P663: *Network Communications Analysis*	-	0.000	5.967	9.331	-	9.331	12.718	7.822	2.934	2.992	Continuing	Continuing

Note

The Department made the decision to sunset the initial thrust of this program in fiscal year (FY) 2014. The program element (PE) has been refocused in FY 2016.

A. Mission Description and Budget Item Justification

Currently fielded satellite communications (SATCOM), terrestrial, and Tactical Data Links (TDLs) will be adversely affected during operations in contested Anti-Access/ Area-Denial (A2/AD) environments. The primary threat is from sophisticated electronic warfare capable of advanced jamming and signal collection techniques that are rapidly evolving to be more capable and agile. Department of Defense (DoD) advances in smart sensors and smart weapons have created a strong need for robust and resilient networks that are composed of tactical data links of today. In FY 2016, the Network Communications Capability Program (NCCP) will return with a new focus that seeks to enable the development and deployment of Joint assured communications networks. The goals of this program are: to mitigate degradation across battlespace tiers (strategic, operational, and tactical) and domains (nuclear, intelligence surveillance and reconnaissance [ISR], command and control [C2], etc.) and to provide agility that will support the mission needs of Joint Functional Component Commanders (JFCCs), Joint Force Commanders (JFCs), and deployed forces.

The DoD's current TDLs platforms and capabilities (with large investments) are not sufficiently protected from emerging adversary threats and contain insufficient capacity for current and future needs. In order to enable the promise of net-centric operations for the warfighter, the next generation airborne tactical network must provide higher network capacity, greater robustness to electronic attack, better network connectivity, and faster response times to the changing demands from airborne, maritime, and ground users. Many line-of-sight (LOS), beyond LOS, and SATCOM waveforms have been integrated onto airborne platforms for various missions. In addition, there have been a number of design, development, and demonstration efforts to provide improved or specialized performance for air operations. These waveforms necessarily exhibit tradeoffs in target performance attributes including capacity, latency, protection, and complexity. As such, no single waveform capability will be able to satisfy all emerging mission needs. The challenge is to understand the essential needs of the users, avoid needless redundancy, evolve each capability as needed, and integrate separate capabilities into a cohesive network. This transformative research will develop new technologies and exploit existing methodologies to ensure performance in contested A2/AD environments by focusing on future communications networks that are a "leap ahead" of today's capabilities.

Beginning in FY 2016, the NCCP's Robust Tactical Data Links Modernization (RTDLM) project will specifically develop next generation communications layer architecture for airborne networks for operations in anti-access and area denial (A2/AD) threat environments and also seamlessly work with future smart sensors and smart weapons. The network architectures will be flexible enough to allow for the network to support Commander's Intent in any mission, environment, operating tactical platform, and weapon under any threat condition. RTDLM's efforts will specifically focus on developing the advanced component technologies, such as Anti-Jam(AJ)/ Low Probability of Interference (LPI)/Low Probability of Detection (LPD)/ Low Probability of Exploitation (LPE) waveforms, adaptive processing algorithms, adaptive antenna technologies (transmit/receive/nulling), variable power control, Dynamic Spectrum Access (DSA)/Dynamic Spectrum Management (DSM) techniques, self-healing mechanisms, and advanced routing with Quality of Service (QoS) approaches. The guiding tenets for creating this new airborne (C4I) capability encompass

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603662D8Z *I Networked Communications Capability*

enabling new missions, i.e. providing robust and resilient TDLs, communications and networking "service level" capabilities, interoperation, cost (affordable), and improved performance in terms of military value.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	6.980	9.931	-	9.931
Current President's Budget	0.000	5.967	9.331	-	9.331
Total Adjustments	0.000	-1.013	-0.600	-	-0.600
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	-0.528	-	-0.528
• FFRDC Reduction	-	-0.013	-	-	-
• Economic Assumptions	-	-	-0.072	-	-0.072

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603662D8Z / *Networked Communications Capability*	Project (Number/Name) P663 / *Network Communications Analysis*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P663: *Network Communications Analysis*	-	0.000	5.967	9.331	-	9.331	12.718	7.822	2.934	2.992	Continuing	Continuing

Note

The Department made the decision to sunset the initial thrust of this program in fiscal year (FY) 2014. The program element (PE) has been refocused in FY 2016.

A. Mission Description and Budget Item Justification

Currently fielded SATCOM, terrestrial, and TDLs will be adversely affected during operations in contested A2/AD environments. In FY 2016, the NCCP will return with a new focus that seeks to enable the development and deployment of joint robust/resilient and assured communications networks. Initial plans were based only on providing anti-jam enhancements for current TDLs, but with newer requirements for enhancements to LPI/LPD/LPE and the integration of smart sensors/smart weapons, the plans evolved. Initial efforts in FY 2016 are focused on developing the required network architectures. The specific advanced component technologies required for implementation will be prioritized and will form the foundations of the planned prototype designs, experimentation, and demonstration.

Robust Tactical Data Links Modernization (RTDLM) – In a contested environment, especially when conducting forward operations, platforms face a significant electronic warfare threat. The primary threat is from sophisticated electronic warfare capable of advanced jamming and signal collection techniques that are rapidly evolving to be more capable and agile. DoD advances in smart sensors and weapons are creating a need for robust tactical waveforms and networks that are beyond the individual communications links of today. Improvements in tactical communication systems for Joint airborne networking are required to mitigate advances in threat electronic warfare systems and enable the smart sensors and weapons of the future.

The RTDLM project will develop the required network architectures that are critical to the warfighter to operate a robust tactical network that seamlessly acts as a SoS with future smart sensors and smart weapons. The required network architectures will be flexible enough to allow for the network to support Commander's Intent in any mission, environment, operating tactical platform, and weapon under any threat condition. Based on the developed thresholds and objectives for the required network architectures, the specific advanced component technologies required will be prioritized and form the foundations of the planned prototype designs, experimentation, and demonstration. The RTDLM project will develop the advanced component technologies to address these needs by designing and building prototype systems to verify the technology in operationally relevant environments against representative threats, and manage the migration and transition of these technologies to service platforms, radios, and other combat mission systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Robust Tactical Data Links Modernization (RTDLM)	-	5.967	9.331
Description: NCCP will address the required network architectures that are critical to the warfighter to operate a robust tactical data link/waveforms and resilient network that seamlessly acts as a SoS with future smart sensors and smart weapons. The RTDLM project will research, develop and employ the capabilities based framework, advanced component network technologies, SoS integration technologies, experimentation, and analytical efforts to support advances in DoD TDLs to effectively create a			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603662D8Z / *Networked Communications Capability*	**Project (Number/Name)** P663 / *Network Communications Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
robust tactical network to operate in contested A2/AD environments. Spectrum awareness, agile spectrum access/management, and adaptive networking significantly mitigate the effectiveness of interference or collection/identification by the adversary and retain reliable connectivity and C2. This project will investigate and develop the required advanced component technologies and integration efforts that yield the flexibility in the tactical network, supporting capability changes as a mission progresses from phase to phase. The Commander's Intent will evolve according to dynamic changes in the utilization/access of the spectrum, and the choices of: waveforms, power, adaptive directional networking, and cross-banding, along with the associated latencies, capacities, and the Quality of Service (QoS) required to enable critical mission applications. It will develop and mature technologies to support direct transition of the algorithms, prototype implementations, waveform improvements, and system design improvements to radio, waveform, and weapon systems programs managed by each military department via fully instrumented field demonstrations and assessments. Overall Goal: Increase communication and network performance (i.e. "Buy-Back" degraded capabilities and enable agile/resilient SoS tactical network operations), while improving robustness and availability of these communication waveforms and networks to adversary electronic warfare attack or collections. ***FY 2016 Plans:*** - Develop and prototype innovative/transformative Tactical Data Link/Waveform (Anti-Jam/LPI/LPD) technologies such as, but not limited to, " Adaptive Coding, Advanced Receiver Processing algorithms, Adaptive Nulling antenna algorithms and control subsystems and adaptive data forwarding and routing overlay" for integration into TDL radio systems for improved operations in contested A2/AD environments. The goal is to achieve enhanced capacity, connectivity and spatial/time adaptive algorithms. - Develop the next generation communications layer architecture for airborne networks for operations in anti-access and area denial (A2/AD) threat environments in a capabilities based framework. This effort will support the planning, development, design, and assessments of the advanced component technologies that will be further ranked and prioritized for development of the planned prototypes, experimentation, and demonstration. - Develop/conduct the specific technology (simulation/emulation based) assessments and recommendations for prioritized investments in the various elements of the required network architecture(s) and the technology roadmap. These assessments will guide the development of both laboratory and field/operational demonstrations. ***FY 2017 Plans:*** Continue research, design, and development of advanced adaptive antenna, control subsystems, and waveform and receiver algorithms (these products will be used for full hardware/software prototype implementations). Begin development of robust tactical data links/waveforms and network components for initial laboratory component level evaluations in FY 2017. - Advanced waveforms for enhanced AJ and LPI/LPD/LPE capabilities - Adaptive Coding/Enhanced Capacity Prototype			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603662D8Z / *Networked Communications Capability*	**Project (Number/Name)** P663 / *Network Communications Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Adaptive Coding/Enhanced Connectivity Prototype - Advanced Feature Suppression/Variable Power Control Prototype - Adaptive Receiver Based mitigation algorithms - Single Jammer Prototype - Adaptive Directional Antennas - Transmit/Receive Prototype - Dynamic Switching Control Prototype - Adaptive Nulling Antennas - Enhanced Spatial/Time Filtering Prototype(s) - Dynamic spectrum access (Variable cognitive channels with supporting sensing) - Multichannel Prototype - Cross-banding - Adaptive Multi-band Translation Prototype - Adaptive Networking - Knowledge Based Intelligent Situational Awareness Prototype - Advanced Routing/QoS Prototype - Develop updated technology assessments of the proposed network architecture in end to end mission based scenarios.			
Accomplishments/Planned Programs Subtotals	-	5.967	9.331

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The RTDLM project will address capability gaps for Joint TDL networks by developing the technologies that the Military Departments can incorporate in future platform and radio acquisitions. The proposed experimentation, with field demonstrations and modeling, will increase the Technology Readiness Level (TRL) of critical technology components, suitable for transition to acquisition programs. This will also help provide DoD leadership with the supporting technical and cost details to identify candidate "building blocks" for timely incremental improvements.

E. Performance Metrics

The Research, Development, Test, and Evaluation (RDT&E) goal for RTDLM is capability improvements that achieve 70 percent “Buy-Back” of the tactical data link range ratio and 80 percent of the area of operation lost in the A2/AD environment.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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Actual Performance Improvements: Prototype and transition designs, software, and hardware; usage of federated test beds; and demonstration of radio prototypes and modeling tools. The goal is to achieve the following metrics:

- Enhanced Capacity: 5X-10X Faster
- Enhanced Connectivity: 4X-10X Range
- Enhanced Spatial/Time Filtering: 4-7 Adaptive Nulls (Scenario Dependent)
- Receiver Based Mitigation: 20-30dB per Jammer Type (Scenario Dependent)
- Enhanced LPI/LPD: 4X-10X Closer Range to Target with Same Percent LPI/LPD

Achieve significant DoD savings for radio modifications or integration into new terminals (economies of scale), as services share non-recurring development costs for common and successful TDL enhancements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603680D8Z / *Defense Wide Manufacturing Science and Technology Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	158.554	88.135	156.743	158.398	-	158.398	136.848	116.354	89.326	70.288	Continuing	Continuing
P680: *Manufacturing Science and Technology Program*	111.117	22.785	20.245	21.311	-	21.311	22.078	23.798	31.188	35.372	Continuing	Continuing
P350: *Manufacturing Innovation Institutes*	47.437	65.350	136.498	137.087	-	137.087	114.770	92.556	58.138	34.916	Continuing	Continuing

A. Mission Description and Budget Item Justification

Defense-wide Manufacturing Science and Technology (DMS&T), established within the Manufacturing Technology Program directed in Title 10 USC Section 2521, provides the Department with a comprehensive manufacturing program to achieve the strategic goals of focused technology, improved acquisition across the life cycles, and cost-effective logistics. By designing for manufacturability early in development, anticipated results will have an impact on increasing reliability and decreasing the life cycle burden of weapon systems. The mission to anticipate and close gaps in defense manufacturing capabilities and drive significant system life cycle affordability benefits makes DMS&T an increasingly important leveraging tool in the current budget environment.

DMS&T will: 1) address manufacturing enterprise game-changing initiatives that are beyond the scope of any one Military Department or Defense Agency or platform and, 2) establish and mature cross-cutting manufacturing processes required for transitioning emerging technologies which impact the time lines, affordability, and productivity of acquisition programs and shorten the deployment cycle times.

The DMS&T program is fundamental to a coordinated development process. Concurrent development of manufacturing processes with the S&T development enables the use of emerging technologies. Key technical areas for investment for DMS&T include Advanced Electronics and Optics Manufacturing, Advanced Materials Manufacturing, and Enterprise and Emerging Manufacturing. Advanced Electronics and Optics addresses advanced manufacturing technologies for a wide range of applications such as sensors, radars, power generation, switches, and optics for defense applications. Advanced Materials addresses advanced manufacturing technologies for a wide range of materials such as composites, metals, ceramics, nanomaterials, metamaterials, and low observables. Enterprise and Emerging Manufacturing addresses advanced manufacturing technologies and enterprise business practices for defense applications. Key focus areas include the industrial information infrastructure, advanced design/qualification/cost tools, supply network integration technologies and management practices, direct digital (or additive) manufacturing, machining; robotics, assembly, and joining.

The Manufacturing Innovation Institutes program funding is also included in this program element. Technical innovation and leadership in manufacturing are essential to sustaining the foundations of economic prosperity to enable our military to maintain technological advantage and global dominance. To support these goals, Institutes for Manufacturing Innovation Institutes (MII) will serve as regional hubs to accelerate technological innovation into commercial application and concurrently develop the educational competencies and production processes via shared public-private sectors. The establishment of the MIIs, supported by resources from multiple U.S. Government agencies, will spur industry cost-share for manufacturing innovation and quickly develop a pathway for technology-focused regional hubs for collaboration among government, industry, and academia that will meet critical government and Warfighter needs. The concept of these institutes is described in the President's

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603680D8Z *I Defense Wide Manufacturing Science and Technology Program*

National Science and Technology Council report by the Advanced Manufacturing National Program Office entitled, "National Network for Manufacturing Innovation: A Preliminary Design," published in January 2013.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	90.966	157.056	119.714	-	119.714
Current President's Budget	88.135	156.743	158.398	-	158.398
Total Adjustments	-2.831	-0.313	38.684	-	38.684
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-0.313			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.796	-			
• DoD rebalancing of accounts	-	-	-0.400	-	-0.400
• Reprogramming for Cancelled Accounts	-0.035	-	-	-	-
• Economic Assumptions	-	-	-0.916	-	-0.916
• Establish two additional Manufacturing Innovation Institutes (#7 and #8)	-	-	40.000	-	40.000

Change Summary Explanation

Two project codes are used in this Program Element (PE) to distinguish between the level of funding for the Core OSD Manufacturing Technology program (P680) and the Manufacturing Innovation Institutes (P350). The growth in funding in this PE from prior President's budgets is wholly associated with the addition of the MII (P350) program.

P350 Manufacturing Innovation Institutes (MII) - issues affecting year-to-year changes:
1) Cooperative Agreement (CA) five-year funding profiles for each of eight institutes are not straight-line funded in each year, but instead are incrementally increased and decreased across five fiscal years, with the third year being the peak year. This profile leverages the ability to attain matching funds from industry and academia partners for R&D projects.
2) The number of institutes changes from five in FY 2015 to six in FY 2016, and to eight in FY 2017.
3) FY 2016 and FY 2017 are the peak years for funding for the MII program, with significant annual decreases programmed annually subsequent to FY 2017.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603680D8Z / *Defense Wide Manufacturing Science and Technology Program*	**Project (Number/Name)** P680 / *Manufacturing Science and Technology Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P680: *Manufacturing Science and Technology Program*	111.117	22.785	20.245	21.311	-	21.311	22.078	23.798	31.188	35.372	Continuing	Continuing

A. Mission Description and Budget Item Justification

The DMS&T program has a two-pronged approach: 1) technology initiatives and 2) specific single projects. Technology initiatives, in collaboration with the Joint Defense Manufacturing Technology Panel (JDMTP) and industry, identify and develop investment strategies to advance the manufacturing processes needed to support the specific technology. Above-the-shop-floor investments focus on new manufacturing processes that have potential to significantly improve manufacturing efficiencies. Single specific projects address investment opportunities not associated with selected technology initiatives and enable the program to respond to urgent, compelling manufacturing needs and provide seed funding to more high risk-high payoff technologies.

Data calls are launched through two methods to identify technology initiatives and single specific issues requiring investment. One method is through the JDMTP. The JDMTP is comprised of the ManTech Directors from the Services, Defense Logistics Agency, and Office of Secretary of Defense (OSD). The call is distributed through the ManTech Directors to the four JDMTP sub panels: Metals Processing and Fabrication Subpanel, Composites Processing and Fabrication Subpanel, Electronics Processing and Fabrication Subpanel, and Advanced Manufacturing Enterprise Subpanel. Potential candidates are evaluated by the JDMTP based on criteria set forth in the call and announcements, and then down-selected for further development prior to final selection. The other method is through Broad Agency Announcements to industry. Priority is given to investments that support affordability and producibility of critical enabling manufacturing technologies that cut across multiple platforms. Investments also balance defense priorities in specialty materials, electronics, propulsion and power, and manufacturing processes including "above the shop floor" (lean and business technologies facilitating interoperable manufacturing). Final projects are selected by the OSD ManTech Director, considering input from the JDMTP and Director of Manufacturing, and as approved by Deputy Assistant Secretary of Defense, Manufacturing and Industrial Base Policy (MIBP). Technology initiatives and projects are executed at the Component level.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Electronics and Optics	13.899	12.182	12.550
Description: Advanced Electronics and Optics is a series of efforts addressing advanced manufacturing technologies for a wide range of applications such as sensors, radars, power generation, switches, and optics for defense applications. Focal points are productivity and efficiency gains in the defense manufacturing base to accelerate delivery of technical capabilities to impact current warfighting operations, and manufacturing technologies to reduce the cost, acquisition time and risk of our major defense acquisition programs. Future efforts will focus on advances in fuel cells, lasers, enhanced acuity microdisplays, and transparent ceramics for opto-mechanical and armor applications.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603680D8Z / *Defense Wide Manufacturing Science and Technology Program*	**Project (Number/Name)** P680 / *Manufacturing Science and Technology Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The Transparent Ceramic Initiative will address DoD applications for electro-optics, including fibers, films, and bulk solid state components, such as windows. Typical materials include: sapphire, ALON, and spinel. Transparent ceramics offer the potential for improved ballistic strength for battlefield armor and personnel protection. Investments include but are not limited to: high strength spinel scale-up, Nanocomposite Optical Ceramics (NCOC) powder scale-up, infrared windows, and curved transparent ceramics. Projects: Silicon Carbide (SiC) High Efficiency Power Switches (FY 2015): Enable a new class of power electronics that allows flexible new architectures at higher voltages, higher frequencies, less volume and weight, higher temperatures, higher efficiency (reduced fuel consumption), and better power quality that allows flexible architectures with enhanced electronics in a smaller footprint. Demonstrated on a naval power conditioning application, reduced the weight by 90% and volume by 30%. Reduce high voltage pulsed diode $/Amp from $0.40 at 6kv to $0.27 at >20kV. Applications include Army - Platform Modernization Program Navy - DDG51 Flight III (Electric Ships Office, PMS-320); and Air Force – F-35, F-22 (MEA & F-35 Offices). Photonic Crystals for Thermal Beacons (FY 2015): Drive affordability, manufacturability, and quality photonic crystal production to enable Identification of Friend or Foe (IFF), producing a thermal beacon using photonic crystals. Systems impacted include the Thermal Beacon, Intelligence Surveillance and Reconnaissance (ISR) that use Mid-Wave Infrared (MWIR) including MQ1/MQ9/ AC-130/F15/F18/Sniper Pod/Litening Pod, MWIR - Hand Held Imagers, as well as In-line WPN's Sights such as the HISS and INOD Blk3. The benefit is immediate upon reaching the battlefield. Benefits to the Warfighter include decreased fratricide and ability to employ new tactics, techniques and procedures (TTP). Mini Short-wave Infrared (SWIR) Cameras and Imagers (FY 2015-2016): Expedite the transition of 10 um (TEC)-less SWIR cameras to the warfighter and develop wafer level processing techniques to improve yield and reduce contaminants in the SWIR focal plane array (FPA)/ camera assembly. Will establish the industrial base for SWIR technology systems and components. Reduced unit cost allows more individuals to carry imagers; 6x improved cost, reduced from $30K to $5K; 3x reduced size from 3cm3 to 1cm3; 3x reduced weight from 120 g to 40 g. Applications include COSI, INOD, COS3, AWST, Joint Effect Targeting System (JETS), IDNST, PAWS, and MTS-B. Mini Vis - SWIR Cameras and Imagers (FY 2016): Develop a manufacturing capability to produce one camera that can see the entire spectral band of Visible, Near Infrared (NIR), and Short-wave Infrared (SWIR); while being compatible with visible, NIR, and SWIR laser pointers and illuminators. Applications include: COSI, INOD, COS3, Advanced Weapon Sight Technology (AWST), Joint Effect Targeting System (JETS), Integrated Day/Night Sight Technology (IDNST), PAWS, and Multispectral Targeting System (MTS-B).			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Manufacturability of Vertical Cavity Surface Emitting Lasers (VCSELs) – Phase I (FY 2015) Develop better performance for laser sights, laser illuminators, and laser designators as measured by size, weight and power and wider scale deployment of critical laser-based systems due to lower cost. Provide clearer illumination critical for positive Identification (ID) Friend vs. Foe, facial ID, weapons ID; covert wavelengths; improve packaging (10-100x smaller and lighter products); increase reliability (10,000 hrs.). Applications include PUMA, RAVEN, TigerShark, Anubis, Spectre-FINDER, Speckles, TigerMoth, WAAS, PAWS, IPODS, AngelFire, MAV-OBAT, nLoss, LOS-short, CLRF, Joint Effect Targeting System (JETS), IDNST, TLDS, Big Safari, OEF, OIF, STINGER, ARGUS, and others.			
Manufacturability of Vertical Cavity Surface Emitting Lasers (VCSELs) – Phase II (FY 2016-2017): Develop the capability to produce a Multi-Function Laser Illuminator and Pointer that delivers the functionality of five different devices (Green, NIR, and Short-wave Infrared (SWIR) Laser Pointers plus NIR and SWIR illuminators) in a single, high-power, lightweight unit, which would give the warfighter commonality with all other weapon systems and be covert. Would provide the SWIR VCSEL a three-fold increase in efficiency and output power to meet critical needs for covert illumination in both High Definition and SXGA formats. Applications include: PUMA, RAVEN, TigerShark, Anubis, Spectre-FINDER, Speckles, TigerMoth, WAAS, PAWS, IPODS, AngelFire, MAV-OBAT, nLoss, LOS-short, CLRF, Joint Effect Targeting System (JETS), IDNST, TLDS, Big Safari, OEF, OIF, STINGER , and ARGUS, others.			
Vital Infrared Sensor Technology Acceleration (VISTA) High Temp Mid-Wave Infrared (MWIR) Detectors (FY 2015-2017): Establish a critical domestic industrial base for MWIR focal plan arrays (FPA) having capabilities in III-V antimony-based Infrared (IR) FPAs to reduce size, weight, power, and cost while increasing yield and operability as an alternative to current technology. Will achieve wafer production scale-up to 40-50 wafers per month while shortening sensor turn-on and cool down time by 50%, extending cooler lifetimes 150% - 200% as a result of reduced stress during temperature cycling, and substantially reducing the sensor lifecycle maintenance cost. Applications include: Air Force: EODAS Enhancement (F-35), EOTS Enhancement (F-35), LWIRST (F-15), Targeting System Enhancements (MQ-9, F-16), Overhead Persistent Infrared (OPIR); Army: Next Gen FLIR, Degraded Visual Environment, Rotary Wing Pilotage; Navy: Shipboard Multifunction Sensors (APDIS), Overhead Persistent Surveillance for USMC, UAV, and Navy: BAMS, F-18 (Advanced IRST), EO/IR Standard Integration System (EISIS), and Affordable Modular Panoramic Photonics Mast.			
Improved Focal Plane Array (FPA) – Hyperspectral – Phase II (FY 2015-2017): Demonstrate utility of III-V based FPAs for Long-Wave Infrared (LWIR) Hyperspectral (HIS) applications. Up to $1M/year/sensor reduction in system life cycle costs compared to arsenic-doped silicon blocked impurity band (Si:As BIB) detectors. Significant reduction in up-front costs compared to Mercury Cadmium Telluride (MCT). Improved reliability, maintainability, and availability, along with increased detection range.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Organic Light Emitting Diode (OLED) Microdisplays - Phase II (FY 2016-2017): Establish manufacturing capability for producing an ultra-high resolution, high brightness, high contrast, full color microdisplay at a low unit cost. Mature and combine manufacturing processes: Silicon on Insulator (SOI) and Direct Patterning technologies to enable a 5X improvement in yield and 5X longer lifetime of displays, reducing life cycle costs. $$221.7M savings for aviation and Enhanced Visual Acuity (EVA) goggles (27,700 displays between 2017-2032) x $8K/unit savings). Applications include F-35 Heads-up Helmet Mounted Display System, Apache, EVA, F-18, F-15, F-16, affordable color/monochrome displays with high brightness and high contrast to enable Warfighter to fully use sensors and cuing/augmented reality hardware.

Radar Affordability Initiative (RAI) (FY 2015): RAI offers DoD common, modular building blocks performing like functions across radar and electronic warfare (EW) systems. The RAI approach enables acquisitions to complete subcomponents within a design. The DoD also receives Government Purpose Rights (GPR) for each investment, enabling competition, and breaking sole source dependencies. At the completion of RAI projects, DoD will have GPR for T/R Modules, solid state amplifiers, and limiters. Additionally, the DoD will have evidence that applying the common, modular approach shortens hardware upgrade times. The RAI Affordable Transmit-Receive Modules (ATRM) project is aimed at reducing the cost of the G/ATOR T/R Module (while maintaining module form factor, performance, and reliability) through incorporating the functionality of three separate regulator chips into a single, super regulator chip and development of a high power amplifier (HPA) 2nd source.

Radar Affordability Initiative – SPS-49 (FY 2016-2017): The SPS-49 program is focused on the design and development of an affordable upgrade of the AN/SPS-49A(V)1 below deck equipment with modern, sustainable, maintainable equipment in a high reliability, high availability operational environment. This upgrade program will design, fabricate and test three Engineering Development Model 49AUs built using production processes and designed with an open system architecture which is easily maintained and easily upgraded. The 49AUs will be installed on U. S. Navy ships for operational testing and evaluation.

Nanocomposite Optical Ceramics (NCOC)(FY 2016-2017): Advance manufacturing maturity of NCOC to replace sapphire. The large reduction of emissivity at elevated temperatures experienced during flight makes NCOC more favorable for a missile dome by increasing the signal to noise ratio. Effort will focus on scale-up NCOC dome manufacturing processes to meet projected AIM-9X full rate production quantities.

FY 2015 Accomplishments:
Silicon Carbide (SiC) High Efficiency Power Switches: Completed Stage 1 & Stage 2 of 3-Stage expansion of Gen 2 SiC wafer seed crystals to 133 mm diameter wafer. Continued work on alternative approach to reduce defects in production Gen

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603680D8Z / *Defense Wide Manufacturing Science and Technology Program*	**Project (Number/Name)** P680 / *Manufacturing Science and Technology Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
1 150 mm SiC crystals. Continued progress on 3 x 150 mm Hot-Wall SiC epi reactor development. Completed fabrication and characterization of multiple 1200V SiC trench Metal Oxide Semiconductor Field Effect Transistor (MOSFET) fab lots. Mini Short-wave Infrared (SWIR) Cameras and Imagers: Completed the following: baseline focal plane array (FPA) production lot to establish starting cycle time and identify improvement area; initial development of wafer level diamond point turning, FPA level polishing, and FPA level anti reflective coating processes; and thermos electric cooler (TEC) stabilized camera core used for TEC-less data collection and algorithm development. VISTA High Temp MWIR Detectors: Continued efforts to integrate High Operating Temperature MWIR FPA technology developed under the larger VISTA program into the F-35 EODAS system. Began FPA fabrication, process optimization and maturation, and supporting integrated dewar cooler assembly field testing. Manufacturability of Vertical-Cavity Surface Emitting Lasers (VCSELs) - Phase I: implemented process changes to improve yield of high power pump modules; built and tested prototype VCSEL pump modules; completed high power pump module demonstration with monoblock laser; explored approaches to improve low power illuminator beam uniformity; met program threshold for low power illuminator lifetime reliability; and fulfilled customer orders for high power illuminators. Improved Focal Plane Array (FPS) - Hyperspectral – Phase II: awarded contract to demonstrate utility of III-V based FPAs for Long-Wave Infrared (LWIR) Hyperspectral (HIS) applications. Up to $1M/year/sensor reduction in system life cycle costs compared to arsenic-doped silicon blocked Photonic Crystals for Thermal Beacons: established photonic crystal foundry processes, layout, and flow. Processes established included growing, dicing, etching, and vacuum sealing. Leveraged prior investment in development of prototype beacons. Executed the photonic crystal emitter fabrication steps to enable a transition from MRL 4 to MRL 7. Radar Affordability Initiative: initiated Affordable Transmit-Receive Modules (ATRM) Super Regulator design activity for incorporating three separate regulator chips into one; began consolidation of functionality using SiGe MMIC technology as well as migrating to a non-hermetic organic package; researched and identified second source opportunities; completed Printed Circuit Board (PCB) material trade studies. PCB material Megatron 6(N) was selected to best meet performance goals. Completed the Quad Flat No-leads (QFN) packaging trade study (Sumitomo Bakelite {Gen7} material selected). Critical Design Review (CDR) milestones were achieved. ***FY 2016 Plans:***			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Mini Short-wave Infrared Cameras and Imagers: establish plan for device transitions; continue wafer growth/processing, hybridization, sensor packaging, and camera calibration efforts. Mini Vis - SWIR Cameras and Imagers: completed design and development of additional manufacturing processes for sensor substrate removal; developed specifications for vis-SWIR devices; and developed test and evaluation methods for extended response to <900 nm. VISTA High Temp MWIR Detectors: develop fabrication process improvements that reduce defects and increase availability and yields; target achievement of wafer production scale-up to 40-50 wafers per month while shortening sensor turn-on and cool down time by 50%, extending cooler lifetimes 150% - 200% as a result of reduced stress during temperature cycling, and substantially reducing the sensor lifecycle maintenance cost. Manufacturability of Vertical-Cavity Surface Emitting Lasers – Phase II: continue pointer device development; design and develop electronics and packaging; and begin planning for manufacturing and field testing. Organic Light Emitting Diode (OLED) Microdisplays – Phase II: conduct an initial Manufacturing Readiness Assessment (MRA); identify key processes for direct patterning; perform diagnostic tests to enhance understanding of direct patterning device performance; identify, design, and order direct patterning equipment; fabricate graphics array test cells and product wafers for the direct patterning initiative; install and test the initial linear sources for the direct patterning initiative; complete a design and tape-out of the Silicon on Insulator (SOI) backplane; demonstrate OLED on Silicon on Insulator and direct patterning on bulk silicon. Improved Focal Plane Array (FPS) - Hyperspectral – Phase II: focus on detector and FPA fabrication, testing, and validation; demonstrate 640x480, 20 µm Very Long Wavelength Infrared FPAs; provide detailed FPA characterization; develop cost and yield models using multi-wafer lot runs. Radar Affordability Initiative – SPS-49: initiate design and development of an affordable upgrade of the AN/SPS-49A(V)1 below deck equipment with modern, sustainable, maintainable equipment in a high reliability high available operational environment. Nanocomposite Optical Ceramics (NCOC): Manufacturing Readiness Levels (MRLs) for NCOC dome manufacturing needs to shift from 4 to 7 over the next two years to support transition activities associated with AIM-9X. Manufacturing tasks will target low-			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
rate initial production (LRIP) activities in 2017 followed by full rate production (FRP) starting in 2018. Manufacturing activities will include raw material costs, powder conditioning, blank forming, heat treatment, optical finishing and coatings. ***FY 2017 Plans:*** Improved Focal Plane Array (FPS) - Hyperspectral – Phase II: continue producing focal plane array (FPA) lots; continue to determine FPA yield for each lot by verifying FPA performance; modify manufacturing processes between each FPA lot to increase yield. Manufacturability of Vertical-Cavity Surface Emitting Lasers – Phase II: continue device development and product transitions; continue making gains in wall plug efficiency (WPE), illuminator power, and reliability. Organic Light Emitting Diode Microdisplays - Phase II: develop direct patterning and SOI backplane; demonstrate critical manufacturing processes (direct patterning: 0.5 um accuracy, linear source process uniformity, SOI: high dynamic range, display uniformity); qualify the SOI process at the foundry; install the final direct patterning equipment; conduct iterative improvement direct patterning lot runs; initiate a SOI qualification plan; conduct an interim Manufacturing Readiness assessment. Radar Affordability Initiative – SPS-49: design and develop an affordable upgrade of the AN/SPS-49A(V)1 below deck equipment with modern, sustainable, maintainable equipment in a high reliability, high availability operational environment. VISTA High Temp MWIR Detectors: continue GaSb substrate quality improvement; continue single-detector-wafer production optimization; continue molecular beam epitaxy (MBE) capability scale up to 40 - 50 wafers per month; fabricate focal plane arrays (FPAs) on 5 inch wafers. Nanocomposite Optical Ceramics (NCOC): Continue powder conditioning, blank forming, heat treatment, optical finishing and coating related activities; measure results and assess Manufacturing Readiness Levels.			
Title: Advanced Materials Manufacturing	6.303	5.401	5.713
Description: Advanced Materials Manufacturing is a series of efforts addressing advanced manufacturing technologies for a wide range of materials such as composites, metals, ceramics, nanomaterials, and metamaterials. Through productivity and efficiency gains, these manufacturing technologies will accelerate delivery of technical capabilities to impact current warfighting operations, while reducing the cost, acquisition time and risk of our major defense acquisition programs. Advanced materials manufacturing technologies undergoing development include materials for ballistic survivability and ballistic protection, survivability and rapid fabrication of structural components.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Advanced Propulsion Initiative: Advance propulsion has a crucial need to develop fuel efficient sustainable propulsion capabilities. Several technologies will be developed including Risk-based Life Cycle Management for System Sustainment and As-Manufactured and As-Maintained State Awareness. In addition, technologies will be pursued addressing capability gaps associated with adaptive engine design and high performance lightweight materials, organic matrix composites, oxide/oxide composites, thermal barrier coatings for high temperature structure and light weight alloys. Additional capabilities will focus on unique manufacturing challenges associated with affordable Medium-Small Engine fabrication methods including Expendables. Projects: 40MM M433 Warhead Producibility (FY 2015): Achieve improved anti-personnel lethality at the squad level, increasing first shot effectiveness against personnel targets through optimization of production process prior to transition to Full Rate Production, avoiding high cartridge unit costs with a projected $17/round cost reduction. Primary applications include Mk 19 GMG, M203 GL, M320GL, and M32 MSGL. Secondary applications include Cannon and Tank Calibers, and Hand Grenades. Automated and Rapid Boot Installation (FY 2015-2016): Achieve an F-35 Program-wide 30% reduction in touch labor for boot installation and boot hole cutting. Improve fit and finish, reducing production span times (20s/fastener to 3s/fastener for boot hole cutting), reducing kitting, eliminating time for adhesive mixing, application, and vacuum bagging. Applicable to all aircraft acquisition and sustainment communities. Cold Spray Repair and Rebuild Phase II - Large Structures (FY 2015-2017): Expand the Cold Spray product envelope from 5 feet to a target of 40 feet to enable large tubular component repair. Applications include Seawolf Class Submarine Periscopes and TD-63 Actuators. Dimensions on Day One (FY 2015, FY 2017): Demonstrate a methodology that accurately predicts and accounts for the numerous geometric, tooling and material factors impacting finished composite parts enabling the correct upfront process and tooling design to yield first article parts meeting the “dimensional requirements on day 1”. Applications include F-35/UCLASS/F/A-XX/Long Range Strike for maintaining part and aircraft tolerances, which enables survivable, supportable and affordable air vehicles. Large Scale Encapsulate Ceramics - Phase II (FY 2016): Enable combat vehicles to defeat the large caliber Kinetic and Chemical Energy objective threats within the allocated weight parameters. Help address affordability of the armor, with an estimated cost reduction of $10K /sq. foot. Armor panels will be producible in the shapes required by individual vehicles. Applications include			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Abrams, which has a known protection limitation. GCV and other vehicles will use this technology to design those areas of vehicles subject to large caliber KE and CE threats.

Out of Autoclave Processing of Organic Matrix Composites (OMCs) for Advanced Propulsion (FY 2017): Current state of the art out of autoclave processable OMCs are currently limited to a service life of between 325F and 375F limiting advanced propulsion applications. Expanding performance of OMCs to temperatures between 400F and 625F will dramatically increase the design trade space for developing the next generation advanced propulsion systems. Advanced propulsion structure includes front frames, vanes, stators and outer by-pass ducts. Insertion of this technology onto the Adaptive Engine Transition Programme (AETP) will lower cost, increase range and maintain performance for the next generation tactical aircraft.

Fabrication of Non-Eroding Metallic Throat (FY 2016-2017): Scale the manufacturing of Thin walled, Non-Eroding Tungsten (W) Throats from 4” up to 12” inner throat diameters. Applications include Stage 2 & Stage 3 ICBMs as well as Stage 2 Standard Missile III.

FY 2015 Accomplishments:

40MM M433 Warhead Improvement Producibility: developed injection molding and discrete fragment insertion tooling and processes; optimized mold stages to decrease time to load parts, over-mold parts & transition to follow on stages; developed fragment insertion methods/tools to reduce time to fill mold with fragments & settle/align fragments; enabled mold stage transitions at reduced cycle times.

Automated and Rapid Boot Installation: conducted pre-production evaluations of complex boot assemblies; determined implementation approach; solicited Request for Proposals for pressure sensitive adhesive applications.

Cold Spray Repair and Rebuild Phase II - Large Structures: assessed the repair and processing requirements for the large parts on the submarine periscopes and stern tubes of the Virginia 688, Ohio 726, and Sea Wolf.

Dimensions on Day One: created process methodology and identified required materials not addressed in current predictive software; tested materials for resin shrinkage and coefficient of thermal expansion; developed predictive capability methodology training; created and evaluated predictive model for a subcomponent with simple modeling characteristics and compared to “as built” hardware.

FY 2016 Plans:

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Cold Spray Repair and Rebuild Phase II Large Structures: expand the capability of Cold Spray Phase I System to accommodate larger components; incorporate a means of processing long parts (40 feet); develop a fully integrated "tube" repair processing line. Automated and Rapid Boot Installation: implement adhesive application development to enable reduced cycle time and improved quality. Large Scale Encapsulate Ceramics - Phase II: conduct manufacturing trials to scale up solutions; test full-size panels; refine models; produce the required thermal design power to manufacture the armor panels; set up a Government manufacturing facility. Fabrication of Non-Eroding Metallic Throat: study Vacuum Plasma Spray (VPS) manufacturing capability scale-up issues; fabricate 4” diameter specimens and conduct thermal-mechanical property testing to use as a material property baseline; modify equipment for scale up to 6” diameter specimens; assess instrumentation for control and diagnostics research needed to increased size and shape (diameter, thickness, length) for inner throat diameters up to 12”; develop and test a coating system to limit reaction of the W throats with its carbon support structure; investigate non-destructive evaluation (NDE) techniques for tungsten based nozzles; Use modeling, the material properties, the nozzle size requirements and the proposed propellant temperature to determine the optimal thickness requirements for the thin walled throats.			
FY 2017 Plans: Cold Spray Repair and Rebuild Phase II Large Structures: final integration and system demonstration. Dimensions on Day One: scale the model up to a full-size highly complex component, compare predictions to an as-built component, and demonstrate Manufacturing Readiness Level 7 capability. Out of Autoclave Processing of Organic Matrix Composites (OMCs) for Advanced Propulsion: develop novel manufacturing capabilities for affordable OMC advanced propulsion structure including front frames, stators and ducts; mature current state of the art OMC systems with elevated service life ranging from 375F to 625F, beyond the capabilities of BMIs and cyanate esters. Fabrication of Non-Eroding Metallic Throat: produce 6” specimens and conduct testing; modify equipment and produce 9” specimens; study post VPS processing to assure 98% density. This included sintering and hot isostatic press (HIP) consolidation scale-up issues. Conduct research to improve the manufacturability of non-eroding throats; continue investigating and updating size requirements and non-destructive evaluation techniques; assess assembly requirements for supports/insulators and			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
recommend/assess measures to reduce step down erosion in the exit cone; construct a material property data base as a function of VPS size and processing; create a preliminary design for scale-up of non-eroding throats to 12” ID.			
Title: Enterprise and Emerging Manufacturing	2.583	2.662	3.048
Description: Enterprise and Emerging Manufacturing addresses advanced manufacturing technologies and business practices for defense applications. Key focus areas include direct digital (or additive) manufacturing, advanced manufacturing enterprise, machining, robotics, assembly, and joining. Projects selected will accelerate delivery of technical capabilities to impact current warfighting operations while reducing cost, acquisition time, and risk of major defense acquisition programs. It is paramount for the U.S. military to improve its own agility and flexibility. The focus is to find a solution to overcome a burdensome acquisition cycle requiring a great amount of cost, time, security, and storage space. Through the use of secure satellite data links or a local parts database, warfighters can access computer-aided design (CAD) for replacement parts, allowing them to repair equipment without the need to establish supply chains or wait for shipments. It allows operators to modify a part's design based on its performance in the field. Emerging manufacturing technologies undergoing development include: a large-scale challenge for advanced, interoperable machine tool applications, and methods for exchange of 3D official technical data throughout the supply chain and between the Government and contractors. Cyber Initiative: The manufacturing factory floor is a growing area of concern for DoD cyber security because defense contractors throughout the DoD's supply chain are continually targeted by cyber criminals seeking to: 1) steal technical data, including critical national security information and valuable commercial intellectual property; 2) alter data, thereby affecting processes and products; and 3) impair or deny process control, thereby damaging or shutting down operations. Protecting the operational systems of a manufacturing enterprise presents a different set of challenges from protecting enterprise IT systems and networks. This initiative will focus on the objective of securing the environment for American Manufacturing on the shop floor. Efforts will include: developing cyber threat models, creating a tool to visualize and simulate an attack on manufacturing to understand dependencies; engaging an industry consortium for knowledge/data sharing/threat sharing; building an industry consortium that coalesces industry needs and shares critical data; developing a cyber-physical test environment for manufacturing cybersecurity (e.g., how to test protection for work instructions/process documentation; conducting primary research into creating secure protocols for information across the digital thread; and creating supplier management standard processes and certifications (e.g., a critical security control list). Projects:			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Criticality of American Manufacturing (CAM) (FY 2015): The Defense Systems Information Analysis Center (DSIAC) will provide a detailed analysis of the Criticality of American Manufacturing (CAM) to the resiliency and innovation defense industrial base. The analysis will focus on the criticality of physical and programmatic clustered activity between academia, industry and government to support manufacturing technology and capability. The analysis will address the importance of human capital investment to innovation and the resiliency of the American Manufacturing & Industrial Base.

High Power Ultrasonic Assisted Drilling (FY 2015): addresses the problem of high costs of drilling various alloys of significant strength, High KSI Steels, IN625, and Composites by developing ultrasonic technology for hole-drilling applications to improve productivity and tool life by more than 50%. This process potentially impacts all systems that require drilling of holes.

MTConnect Challenge Phase II (FY 2015-2016): Promote academia's educational development and implementation of production interactive solutions to the broad U.S industrial base with the expansion of MTConnect Challenge that contributes to reduced cycle times and the development of real-time production metrics for adaptable dashboard applications.

Cyber Security for the Shop Floor – Phase II (FY 2016-2017): A follow-on from a previously funded Phase I Red Team evaluation, this phase II project will develop a Trusted and Assured supply chain, identify threat vulnerabilities of industrial control systems, provide input to DoD policies, and shape follow-on investment to mitigate threat vulnerabilities. Applications span the US Defense Industrial Base.

FY 2015 Accomplishments:
MTConnect Challenge - Phase II: Building upon the results of the first MTConnect Challenge, the phase II objective focused on challenging Academia's role in support of the MTConnect expansion in Industry use.

High Power Ultrasonic Assisted Drilling: advanced AcousTech Machining from a Manufacturing Readiness Level (MRL) of 4 to 6 by focusing on Drilling and Milling Studies of Weapons Systems Materials and AcousTech Machining Module Refinement. Feasibility of improvements were observed in the form of increased feed rates, improved surface finish, reduction in force and torque, and burr reduction.

Criticality of American Manufacturing (CAM): began framing the ontology and ecosystem dynamics that define the "Criticality" of American Advanced Manufacturing (AM). This effort focused on baselining the initial argument and scoping the assessment framework for CAM assessments, including: 1) definition of the key components/enablers of AM and its general taxonomy; 2) general mapping of the AM ecosystem and its overall composition and incentive structure; and 3) framing of areas of AM

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
"dominance" vs. "relevance" with requisite sector/technology differentiation. Addressed some general questions in order to lay out a structure for future assessments as well as to bolster future dialogue on current initiatives and communities (among U.S. manufacturing institutes and Communities of Interest). ***FY 2016 Plans:*** MTConnect Challenge – Phase II: Focus on data accumulation in obtaining and exchanging information on the factory floor. Market the challenge opportunities for awareness to the Society of Manufacturing Engineers, NTMA, and Colleges for participation and submittals. Develop judging criteria and initiate development of the challenge review criteria. Cybersecurity for the Shop Floor – Phase II: follow-on efforts from a previously funded Phase I Red Team evaluation that focused on multiple threat levels triggered on manufacturing equipment at the shop floor level. Assess performance of companies for vulnerabilities after implementing the new DFAR requirements. ***FY 2017 Plans:*** Cybersecurity for the Shop Floor – Phase II: develop a trusted and assured supply chain, identify threat vulnerabilities of industrial control systems, provide input to DoD policies, shape follow-on investment to mitigate threat vulnerabilities, and document assessment results that discuss DFAR requirements and suppliers' mitigation and cost implications. Cybersecurity Initiative: continuing and expanded efforts will include developing cyber threat models, creating a tool to visualize and simulate an attack on manufacturing to understand dependencies; engaging an industry consortium for knowledge/data sharing/threat sharing; building an industry consortium that coalesces industry needs and shares critical data; developing a cyber-physical test environment for manufacturing cybersecurity (e.g., how to test protection for work instructions/process documentation; conducting primary research into creating secure protocols for information across the digital thread; and creating supplier management standard processes and certifications (e.g., a critical security control list).			
Accomplishments/Planned Programs Subtotals	22.785	20.245	21.311

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• (BA3) 0603680F: *Air Force ManTech*	-	-	-	-	-	-	-	-	-		
• (BA3) 0603680N: *Navy ManTech*	-	-	-	-	-	-	-	-	-		

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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• (BA7) 0708045A: *Army ManTech - Industrial Preparedness*	-	-	-	-	-	-	-	-	-		
• (BA7) 0603680S: *DLA ManTech*	-	-	-	-	-	-	-	-	-		

Remarks

D. Acquisition Strategy

Not applicable for this item. Outyear data for "Other Program Funding" is contained within the Service budgets.

E. Performance Metrics

The majority of project performance metrics are specific to each effort and include measures identified in the project plans. The metrics include items such as target dates from project work break down schedules, production measures, production goals, production numbers and demonstration goals and dates. In addition, generic performance metrics applicable to the Defense-Wide Manufacturing, Science and Technology (DMS&T) program includes attainment of a previous administration goal, "Speed technology transition focused on warfighting needs". The metrics for this objective and the objective of DMS&T is to transition 30% of completing demonstrations program per year.

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COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P350: *Manufacturing Innovation Institutes*	47.437	65.350	136.498	137.087	-	137.087	114.770	92.556	58.138	34.916	Continuing	Continuing

A. Mission Description and Budget Item Justification

Technological innovation and leadership in manufacturing are essential to sustaining the foundations of economic competitiveness to maintain technological advantage and global dominance for our military. To support these goals, Manufacturing Innovation Institutes (MIIs), each led by non-profit 501(c) entities, will serve as regional hubs to accelerate technological innovation into commercial applications and concurrently develop the educational competencies and production processes via shared public-private sectors. Collaborative execution and funding by the Departments of Defense (DoD), Energy (DOE), and Commerce (DoC), the National Aeronautics and Space Administration (NASA), and the National Science Foundation (NSF) to support the establishment of these MIIs will spur industry cost-share for manufacturing innovation and quickly develop a pathway for technology-focused regional hubs for collaboration among government, industry, and academia that will meet critical government and Warfighter needs. The concept of these institutes is described in the President's National Science and Technology Council report by the Advanced Manufacturing National Program Office entitled, "National Network for Manufacturing Innovation: A Preliminary Design," published in January 2013.

Each of the eight DoD-led MIIs addressed in this budget is expected to be self-sustaining, without reliance on federal sustainment funding, by the end of the respective cooperative agreement (CA) period between the federal government and the non-profit-led consortium. This CA period is typically for five years, with the option to extend the agreement up to two years for the benefit of DoD projects, technical achievement, etc., to fully leverage the minimum 1:1 cost share. All subsequent (post-CA) federal funding provided to any MII will be on a specific project basis by the requirements generators, either within or external to DoD.

Each of the eight DoD-led MIIs is intended to:
1) Bring together industry, universities and community colleges, federal agencies, and state and local governments and organizations to create regionally-based but nationally-impactful public-private partnerships underpinning the formation of sustainable manufacturing innovation ecosystems
2) Accelerate innovation to bridge the gap between Research and Development (R&D) and deployment of technological innovations in domestic production of goods
3) Invest in industrially relevant manufacturing technologies with broad applications, accelerating innovation within DoD and across all manufacturing sectors to increase U.S. competitiveness
4) Provide shared assets to help companies access cutting-edge capabilities and equipment
5) Create an unparalleled environment to educate and train students and workers in advanced manufacturing skills
6) Focus on maturing the associated manufacturing technologies from Manufacturing Readiness Level (MRL) 4 to 7

The first and second year of each of these new institutes is devoted to establishing a sustainable business model, with continued refinement throughout the full period of the cooperative agreement, including: expanding the institute's membership base (as appropriate); establishing and solidifying revenue streams (e.g., funding from new R&D activity, membership fees, training and workforce development, certification and licensing, etc.); establishing provisional Executive Council and Technical Advisory committees to execute the business of each institute; finalizing Intellectual Property plans; developing technology roadmaps to inform investment strategies;

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opening industrial commons to provide for shared resource facilities available to all institute members; initiating workforce training programs in each technology area; establishing complementary relationships between MIIs; analyzing the U.S. and Global industrial base in partnership with other government agencies to build upon the institute portfolio and address critical requirements; and further developing national technology roadmaps.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Institute #1 – National Additive Manufacturing Innovation Institute (America Makes)	15.492	1.011	1.038
Description: Additive manufacturing (i.e., "3D printing") is a process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies such as traditional machining. Advanced additive manufacturing will benefit the DoD by enabling lifecycle cost savings and enhanced capabilities, including moving toward "focused logistics" – getting the right part in the right place in just the right time – for wartime and humanitarian missions using local supply chains. This MII was established in 2012, with cooperative agreement funding included in this budget through FY 2015, and DoD program management costs included in subsequent fiscal years until all R&D projects, reporting, and fiduciary responsibilities are completed. ***FY 2015 Accomplishments:*** Launched a third call for R&D projects based on an updated industry-driven technology roadmap; competitively awarded additional applied research projects with highest potential for industry and government shared benefit; created an ecosystem that formed new supply chains for DoD, including small businesses; established a Satellite Center at University of Texas at El Paso to extend reach into that region. Launched education and workforce training initiatives, including partnering with multiple Government agencies for training and certification programs. Rolled out upgrades to on-line collaboration tools including a capabilities search and knowledge base of institute-developed intellectual property and data. ***FY 2016 Plans:*** Launch a fourth call for R&D projects based on the institutes' most current technology roadmap; competitively review and award additional applied research projects with highest potential for industry and government shared benefit; lead a group of Standards Development Organizations to define needed industry standards; launch a project to enable low-cost sustainment capabilities for DoD; launch enhanced processes for transitioning technologies developed by the MII; implement initiatives to increase the value proposition to members and support MII self-sustainability; continue education and workforce training initiatives. ***FY 2017 Plans:*** Complete execution of all prior year awarded projects and make results available in the knowledge base. Period of performance for the Cooperative Agreement ends on August 31, 2017. Program management subsequently continues to provide oversight through Aug 31, 2019 for the close-out of all R&D projects, cost share accrual, reporting, and transition to sustainability, in addition to completion of RDT&E fiduciary responsibilities.			
Title: Institute #2 – Digital Manufacturing and Design Innovation Institute	13.542	24.021	13.488

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

Description: This national institute focus is on the implementation of the Digital Thread, the unencumbered flow of data across the lifecycle of a manufactured product encompassing data from design, production, supply, sourcing, inventory, assembly, quality, maintenance and sustainment. It includes the analysis of this data to reduce the time and cost of bringing new products to market, the elimination of barriers between design, manufacturing and sustainment by using both product data and process data in a way that is seamless and transparent.

Technology thrust areas: advanced manufacturing enterprise; intelligent machines; advanced analysis; open source platform; and cyber manufacturing system security.

This MII was established in February 2014, with cooperative agreement funding contribution included in this budget through FY 2018.

FY 2015 Accomplishments:
Awarded 32 projects in 12 proposal calls in the technology thrust areas listed above totaling approximately $61 million, of which $30 million was from DoD and $31 million was Cost Share. Worked with the DARPA Adaptive Vehicle Make (AVM) Program to move technologies developed in the AVM program to transition and commercialization. Initiated workforce development projects with World Business Chicago and the Department of Commerce National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership (MEP). Completed the DMDII Headquarters by securing $16.5M in funding for the build out of the new facility from the State of Illinois and the City of Chicago and the donation of more than $3 million in equipment and multiple software systems in the manufacturing lab. Initiated the Digital Manufacturing Commons open platform project which will democratize access to the tools of manufacturing innovation for companies, universities, institutes and entrepreneurs.

FY 2016 Plans:
Launch a call for proposals in the Spring of 2016 with a particular topic in each of the technology thrust areas, with an anticipated result of approximately 15 new projects with a planned value of $7 - $10 million. Conduct multiple Proposal Call Workshops, and award projects in the technology thrust areas identified above. Launch the Beta version of the digital manufacturing commons. Revise the Technology Roadmap and Strategic Investment Plan to lead the technology domain in the completion of a Digital Thread. Activate education and workforce development projects: 1Digital Manufacturing Skills Classification “Taxonomy” to create a comprehensive breakdown of digital manufacturing (DM) skill sets and create job profiles that match industry needs; work with NIST/MEP on cooperative mechanisms such as “Train the Trainer” programs and utilization of their existing small and medium enterprises (SME) network to implement workforce development training and engagement; Digital Analytics Boot Camp to develop a three to five day workshop on digital analytics in the manufacturing environment; Digital Manufacturing-101 to develop DM

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603680D8Z / *Defense Wide Manufacturing Science and Technology Program*	**Project (Number/Name)** P350 / *Manufacturing Innovation Institutes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
open-source, online courses through Coursera for general public but target existing engineers, lead plant managers at Small-and-Medium-sized (SME) Manufacturers. ***FY 2017 Plans:*** Proposal calls are planned to occur approximately every six months consisting of 3 to 4 project calls each, resulting in approximately 30 new projects with a planned value of $10 million. Conduct multiple Proposal Call Workshops, and award projects in the technology thrust areas identified above. Continue the on-going workforce development projects initiated in FY 2016. Instantiate a networking and capability matching mechanism with all new project calls and an online version on the website. Revise the Technology Roadmap and Strategic Investment Plan to lead the technology domain in the completion of a Digital Thread. Announce the commercialization of new digital manufacturing and design technologies and industry capabilities. Significantly scale up commercialization, skill development and workforce development efforts from research projects and relationships with other government agencies (e.g. NIST/MEP).			
Title: Institute #3 – Lightweight and Modern Metals Manufacturing Innovation Institute (Lightweight Innovations for Tomorrow (LIFT)) ***Description:*** Advanced lightweight metals retain properties comparable to heavier, traditional materials, and can enable weight reduction in a variety of components and products with significant energy savings and increased payloads. This MII will scale-up research across multiple areas to accelerate market expansion by applying an integrated materials and manufacturing approach, addressing a lack of design guides and certifications as well as cost and scale-up challenges. The goal is to catalyze the development of an advanced lightweight metal U.S. supplier base and to enable DoD to realize greater speed and agility of manned, unmanned, and Warfighter systems as well as benefits for commercial applications. Technology thrust areas: (1) priority metal classes and its alloys of advanced high-strength steels, titanium, aluminum and magnesium; (2) technology development needs grouped into six pillars: melt processing; powder processing; thermo-mechanical processing; low cost - agile tooling, coatings, and joining and assembly; (3) Crosscutting themes: Integrated Computational Materials Engineering (ICME), design, life-cycle analysis, validation/certification, cost modeling, supply chain, corrosion, and ballistic/blast This MII was established in February 2014, with cooperative agreement funds programmed in this budget through FY 2018. ***FY 2015 Accomplishments:*** Completed project call #1 with a portfolio of 13 projects totaling approximately $9 million, awarded in technology scope areas described above. Second Project call initiated with a planned portfolio value of approximately $10 million in government funds, with projects targeted in key core areas of: applications of new/novel metals and alloys, primary and secondary metal	13.428	27.913	13.521

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

manufacturing processes, and development of additional products utilizing lightweight and modern metals. Launched three education workforce projects. Built infrastructure to design and implement workforce education solutions in its five-State region [OH, MI, IN, TN, KY]. The five-State teams involve over 135 officials in education, workforce development, economic development, labor, industry, state and local government. Launched an advanced manufacturing student engagement video contest partnering Tennessee manufacturers and student teams to raise career awareness and increase enrollment in career and technical education.

With Tennessee Tech, designed a virtual reality demonstration and “challenge” to illustrate the benefits of lightweight metals and lightweighting technologies. Created an interactive, web-based Science, Technology, Engineering and Mathematics (STEM) Mission bringing lightweight technologies and materials and put it in schools in 22 states with over 25,000 students registered to use it. Created 45 boot camps integrating metals and materials, lightweighting, and engineering concepts for high school teachers and community college instructors, reaching over 1,000 teachers in the summer of 2015. Total number of organizations in the LIFT partnership reached 206. Includes 108 organizations with membership letters of intent and 98 workforce development partners.

FY 2016 Plans:

Project calls are planned to occur every six months, with a planned value of approximately $12 million for the year. Conduct project calls and award projects in the previously described technology scope areas. Conduct SWOT (strength-weakness-opportunity-trends) analyses along with road mapping to update the mid, and long-term technology investment strategies. As part of that exercise, will conduct defense-focused workshop designed to assist in mapping investments in defense-related applications. Will introduce the small and medium enterprise (SME) challenge, a “shark tank-type event that will allow SMEs to propose small technology venture projects to a panel of large industry members and subject matter experts. Will complete layout and equipment installation in the headquarters laboratory facility. Plan to introduce an open-source platform of educational resource materials to supplement and improve education from K-12 through graduate degree programs. Will integrate modules on metals, materials, lightweighting technologies and processes. Work with state of Indiana to design the first state-wide “work and learn” initiative to innovate and expand internships, apprenticeships, coop programs, and other models to integrate work-based learning into manufacturing programs at the secondary and post-secondary levels. Will launch workshop series to expand outreach to small and medium enterprises (SME) to additional states within and outside the five-state region. Will also launch workforce initiatives targeting military veterans. Initiate technology transition phase for initial technology development projects, to include training across various levels of the workforce as needed.

FY 2017 Plans:

Project calls are planned to occur every six months, with a planned value of approximately $15 million for the year. In addition, will conduct several technology demonstrations and workshops to disseminate and implement the manufacturing technologies

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
developed during our initial project calls. Conduct a series of workshops targeting small and medium enterprises (SME) across the nation. LIFT will develop a replicable, scalable roadmap to building a technology-competent, educated and skilled workforce – incorporating the new solutions "tested" in the five-State LIFT region – that will expand and enhance STEM education in the nation. Continue to invest in education and workforce development solutions that link education, workforce development, and economic development resources to help create a coordinated economic development asset. Continue implementation and expansion of the "work and learn" initiative developed in FY 2016.			
Title: Institute #4 Integrated Photonics Manufacturing Innovation Institute (American Institute for Manufacturing (AIM) Integrated Photonics)	14.019	33.330	25.390
Description: Integrated photonics manufacturing advances the promise of unprecedented interconnection between electronics and photonics that will deliver previously unattainable performance in speed, density and power consumption, quickly providing differentiating benefits for defense applications such as high-speed signal processing, electronic warfare, information transport and computation, sensing, imaging and targeting. This institute will establish an end-to-end 'ecosystem' in the U.S. for advancing domestic integrated photonics manufacturing. This MII will include responsive integrated photonics fabrication foundry access, photonics-electronics integrated design tools, and advances in packaging, assembly and test automation. The goal will be to catalyze a vibrant, enduring integrated photonics domestic industrial base, much as SEMATECH did with the domestic semiconductor industry. This MII was established in 2015, with cooperative agreement funding programmed in this budget through FY 2019. ***FY 2015 Accomplishments:*** Awarded a Cooperative Agreement, and initiated the stand-up of this new institute following the processes used for previous institutes that have been refined through lessons learned. Convened first institute leadership council meeting. Established DoD steering committee. Integrated DoD and Other Government Agencies with industry's roadmapping activities. Completed a data call for a first round of applied R&D pilot projects and selected project contracts in the key core areas with emphasis given to Manufacturing Centers of Excellence in Inline Control and Test, Electronic-Photonic Design Automation, and Multi-Project Wafer and Assembly. Initiated institute functions for design submission, design rule checking, tape-out, mask, hardware build, coordination of assembly, multi-project wafer runs and product validation. ***FY 2016 Plans:*** Achieve initial operational capability of the integrated photonics manufacturing innovation ecosystem, including more robust photonic integrated circuit design tools, a multi-project wafer capability with a broker function, and new package, assembly, and test tools and facilities. Conduct second round of applied R&D project calls and award projects in the key core areas identified in the roadmapping phase. These core areas include: Very High Speed Digital Data and Communication Links, Analog RF			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Applications, Integrated Photonics Sensors, and Photonic Integrated Circuit Array Technologies. Develop process design kits for silicon and indium phosphide photonics integrated circuits that can be used to prove out new designs by DoD labs and defense contractors through an affordable multi-project wafer capability. Establish a state-of-the-art integrated photonics prototype packaging facility to drive down costs in this critical area. Develop automated tools for cost-effective high volume end-to-end assembly and packaging of photonic integrated components. Continue development of a world-class integrated photonics work force through focused education, webinars, and training programs. ***FY 2017 Plans:*** Implement lessons-learned optimizations of the integrated photonics manufacturing innovation ecosystem, including evolutionary improvements in photonic integrated circuit design tools, multi-project wafer capabilities, and package, assembly, and test tools and facilities. Conduct additional rounds of applied R&D project calls and award projects in the key core areas identified in the roadmapping phase. Transition FY 2016 projects' output to the supply chain. Execute plans for development of a world-class integrated photonics work force through establishment of master's level program, webinars, and training programs. Begin to transition key capabilities from this institute to ongoing DoD programs requiring integrated photonics solutions.			
Title: Institute #5 – Flexible Hybrid Electronics Manufacturing Innovation Institute (Nextflex – America's Flexible Hybrid Electronics Manufacturing Institute) ***Description:*** Flexible hybrid electronics manufacturing involves highly tailorable devices on non-traditional, compliant substrates that combine thinned components manufactured from traditional processes with components that are added via "printing" processes. This institute will invest in prototyping and scale-up of manufacturing processes for high speed pick-and-place, printed circuits, and hybrid fabrication that will enable defense and commercial applications in wearable electronics, unattended sensors and integrated array antennas, medical devices and soft robotics devices, and the continuous improvement in SWAPC (Size, Weight And Power plus Cost) for electronic systems. This institute will establish an end-to-end domestic innovation 'ecosystem,' containing design, packaging, assembly and test automation research and workforce development capabilities which can be accessed by small, medium and large companies as well as academic institutes. The goal is to help enable the creation of a sustainable domestic industrial base which can rapidly respond to global needs using a quick technology cycle and scale-up. This MII was established in 2015, with cooperative agreement funds programmed in this budget through FY 2019. ***FY 2015 Accomplishments:*** Awarded a Cooperative Agreement and established this new MII following the processes used for previous institutes as refined through lessons learned in solicitations and standup of Institutes 1-4. Conducted initial technology road mapping activities with	8.144	31.140	21.688

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Government Subject Matter Experts. Released the first project call (PC-1) for applied manufacturing projects in the key core areas identified within the road mapping activities. ***FY 2016 Plans:*** Build membership and release Participation Agreement and Intellectual Property Policy. Continue to refine core investment areas through industry-led technology roadmapping supporting the innovation ecosystem. Initiate two rounds of applied manufacturing project calls in core areas identified within the road mapping activities. Initiate plans for workforce development projects. ***FY 2017 Plans:*** Continue to refine core investment areas supporting the innovation ecosystem. Initiate two rounds of applied manufacturing project calls in core areas, with each project including components of workforce development.			
Title: Institute #6 - Revolutionary Fibers and Textiles Manufacturing Innovation Institute ***Description:*** The RFT-MII will address the spectrum of manufacturing challenges associated with revolutionary fibers and textiles, from design to end products. It will support an end-to-end innovation 'ecosystem' in the U.S. for revolutionary fibers and textiles manufacturing and leverage domestic manufacturing facilities to develop and scale-up manufacturing processes. The RFT-MII will provide innovative system demonstrations based on robust design and simulation tools, pilot production facilities, a roster of subject matter experts, suppliers, and workforce development opportunities through targeted training and curriculum programs. This MII will be established in early 2016, with cooperative agreement funds programmed in this budget through FY 2020. ***FY 2015 Accomplishments:*** Programmatic planning for establishment of this new institute, including program management and acquisition teams BAA development, proposal reviews, and awardee selection, to support planned cooperative agreement award in September 2015. ***FY 2016 Plans:*** Award a Cooperative Agreement and establish this new MII following the processes used for previous institutes and as refined through lessons learned in solicitations and standup of Institutes 1-5. Conduct initial technology road mapping activities. Complete a data call for a first set of applied R&D projects and award project contracts in the technology areas of: Fiber and textile knowledge management repository and textile design tools, Innovative Product realization in Next Generation Wearable Technology, and Innovative product realization in Next Generation non-Wearable Technology. ***FY 2017 Plans:*** Continue to refine core investment areas supporting the innovation ecosystem. Initiate two rounds of applied R&D project calls in core areas. Execute workforce development projects.	0.725	17.583	21.962
Title: Institutes #7 and #8 - Technology Areas in Development	-	1.500	40.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Two new Manufacturing Innovation Institutes are in acquisition planning, one to be established in late 2016, and one to be established in 2017. Some of the candidate technology focus areas currently under consideration for these two institutes are: Biotech - Regenerative Medicine; Biotech - Continuous Manufacturing of Pharmaceuticals; Securing the Manufacturing Digital Thread – Cybersecurity in manufacturing; Advanced Machine Tools and Control System; and Soft Robotics – Humans working in close proximity to robots. Cooperative Agreement funds are programmed in this budget from FY 2017 through FY 2021. ***FY 2016 Plans:*** Establish program management structure at the Services and OSD levels to support technology selection for each institute, and implementation and acquisition planning and execution, establishing one new institute in 2016 and one in 2017. ***FY 2017 Plans:*** Award Cooperative Agreements and establish each new MII following the processes used for previous institutes and as refined through lessons learned in solicitations and standup of Institutes 1-6. Conduct initial technology road mapping activities. Complete a data call for a first round of S&T projects and award project contracts in the key core technology areas identified within the road mapping activities.			
Accomplishments/Planned Programs Subtotals	65.350	136.498	137.087

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Each Manufacturing Innovation Institute is established through a competitive selection process. The executing military department or agency, in close and continuous coordination with OSD ManTech, publishes a formal solicitation for proposals describing the scope of required activities and extensive proposal evaluation criteria. Non-Profit Organizations (including universities) are eligible to bid, and each bidder forms a broad consortium of industry and academic partners. The executing military department or agency uses a team of government experts to evaluate each proposal against the evaluation criteria and selects a winning consortium. The final terms of the cooperative agreement between the selectee and the federal government are then negotiated and the CA is signed. Throughout and after completion of this process, the federal government makes clear that members of non-selected teams are encouraged to join the selected consortium as conditions permit.

E. Performance Metrics

Experience gained to-date reinforces that the MIIs themselves must be principally responsible, with the Government's oversight, input, and concurrence, for managing metrics to measure progress against objectives. The DoD continues reviewing metrics for each MII at several levels (for example, DoD/funding agency level, individual institute level, and specific technology project level) and is working with each institute to refine specific technology or site-specific measures. At a minimum, the institutes

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are charged with ensuring that key elements of their innovation ecosystem will be matured and made widely available by fostering collaborations between appropriate elements of that ecosystem. The following four categories of metrics have emerged as common focus areas.

1. Impact on U.S. Innovation Ecosystem
2. Financial Sustainability
3. Education and Advanced Manufacturing Workforce Development
4. Technical Advancement

Specific metrics and the annual cycle for measuring progress against benchmarks are developed for each consortium and reflect that MII's unique technology capability, expertise, and organizational structure. The Department is striving to ensure that the assessment process captures and articulates the benefits to national security based upon technological advancements and the industrial base.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603699D8Z / *Emerging Capabilities Technology Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	97.771	68.640	40.949	49.895	-	49.895	29.903	38.118	38.658	39.437	Continuing	Continuing
P795: *Emerging Capabilities Technology Development*	97.771	68.640	40.949	49.895	-	49.895	29.903	38.118	38.658	39.437	Continuing	Continuing

Note

The Emerging Capabilities Technology Development (ECTD) Program Element (PE) supports a focus throughout the Office of the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping (DASD(EC&P)) on producing risk-reducing proof-of-principle prototypes and demonstrations of emerging technologies coordinated through interagency and joint partnerships. ECTD will support the Assistant Secretary of Defense for Research & Engineering (ASD(R&E)) under the mitigating new and emerging threats priority area with longer-term, mission-focused capability development that crosses functional domains to enhance Warfighter adaptability and resilience. The office, in collaboration with government labs, academia and industry will execute projects that target specific mission capability gaps identified by the Combatant Commands (COCOMs), the Joint Staff and senior leadership in the Office of the Secretary of Defense.

A. Mission Description and Budget Item Justification

The ECTD funding supports projects that reduce the technology risk of emerging capabilities by advancing proof-of-principle prototypes in support of near and mid-term operational engagements and stability operations. The framework is guided by the ASD(R&E), DASD(EC&P) and the Rapid Reaction Technology Office's science and technology objectives and focus areas. With an emphasis on interagency and joint partnerships, ECTD develops initiatives to produce capability options that anticipate and inform formal joint and interagency requirements and acquisition processes. Individual projects generally span one to three years, typically at a cost of less than $4.000 million, and are demonstrated and released in spirals within the project timeline. The ECTD program focuses on rapid prototyping of emerging technologies, including electromagnetic spectrum-agile capability options, multi-domain, autonomous systems, counter-weapons of mass destruction and dismounted soldier systems.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	33.658	33.515	32.079	-	32.079
Current President's Budget	68.640	40.949	49.895	-	49.895
Total Adjustments	34.982	7.434	17.816	-	17.816
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	7.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.945	-			
• Other Internal Baseline Adjustment	-	-	18.095	-	18.095
• FY15 Reprog. for Cancelled Account	-0.013	-	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603699D8Z / *Emerging Capabilities Technology Development*

• Other Reprogrammings	35.940	-	-	-	-
• FFRDC Reduction	-	-0.066	-	-	-
• Economic Assumptions	-	-	-0.279	-	-0.279

Change Summary Explanation

The FY 2017 funding increase of $18.095 million is being applied to proof-of-principle demonstrations and prototypes of emerging technologies as well as prototypes designed to counter threats from international information and strategic communications operations.

The FY 2015 funding increase involves funding for higher Department priorities that support the Advanced Capabilities Deterrence Panel / Third Offset strategy. The Long Endurance Airborne Platform (LEAP) project reprogrammed $24.000 million to improve battlespace awareness in the U.S. Central Command (USCENTCOM) Area of Responsibility (AOR). The Missile Defeat Project increase of $11.250 million addressed an operational need in the U.S. Strategic Command (USSTRATCOM) and U.S. Pacific Command (USPACOM) Areas of Responsibility.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
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COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P795: *Emerging Capabilities Technology Development*	97.771	68.640	40.949	49.895	-	49.895	29.903	38.118	38.658	39.437	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Emerging Capabilities Technology Development (ECTD) funding supports projects that reduce the technology risk of emerging capabilities by advancing proof-of-principle prototypes in support of near and mid-term operational engagements and stability operations. The framework is guided by the Office of the Assistant Secretary of Defense, Research and Engineering (ASD(R&E)), the Deputy Assistant Secretary of Defense, Emerging Capability & Prototyping (DASD(EC&P)) and the Rapid Reaction Technology Office science and technology objectives and focus areas. With an emphasis on interagency and joint partnerships, ECTD develops initiatives to produce capability options that anticipate and inform formal joint and interagency requirements and acquisition processes. Individual projects generally span one to three years, typically at a cost of less than $4.000 million, and are demonstrated and released in spirals within the project timeline. The ECTD Program focuses on rapid prototyping of emerging technologies including electromagnetic spectrum-agile capability options, multi-domain, autonomous systems, counter-weapons of mass destruction and dismounted soldier systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Product Architectures, Design and Manufacturing for Operational Responsiveness	1.250	0.000	-
Description: This project demonstrated the gains to be realized by tightly coupling product architectures with manufacturing and design tools, using a prototype unmanned aerial system (UAS) architecture for demonstration purposes. The UAS architecture serves as a test bed for research in system physical and autonomy architectures and their complementary design tools in applying additive manufacturing to accelerate development by orders of magnitude. The demonstration platform for this effort is a modular, rapidly designed and reconfigurable UAS with modules built using additive manufacturing, to enable: construction at any location; structural design tools and methods that guide and constrain designers to provide guarantees on performance and manufacturability; a layered control system architecture that reuses the supervisory and actuator levels of control; and, a system level design tool that allows the user to configure a new vehicle, predict its performance, and automatically generate the flight control laws for the new configuration.			
FY 2015 Accomplishments: The project produced a final prototype system and training materials for a structures design module. Final measures of operational responsiveness and training metrics were provided. The UAS architecture is readily transferrable to operators and the training material is available for use. The products transitioned to Naval Air Systems Command for further toolset development. Additionally, the adaptive design approach has been adopted by elements of the Joint Improvised-threat Defeat Agency (JIDA).			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Using prior year funds, a demonstration of the design and fabrication of the UAS will be conducted in support of emergent requirements by operational personnel.			
Title: Low Cost Missile Defeat (LCMD) Prototype ***Description:*** Low Cost Missile Defeat (LCMD) is a ballistic missile defense system designed to counter current and emerging weapons of mass destruction (WMD) and anti-access/area denial (A2/AD) threats using primarily existing commercial off-the-shelf (COTS) technology. LCMD program execution has been structured using a building block approach. The first phase successfully produced an in-depth system design to provide the mission performance baseline leading to a validated concept of operations (CONOPS). The CONOPS for the system has been formulated to integrate LCMD into the existing National Ballistic Missile Defense (BMD) architecture and will prioritize the use of existing components and systems already fielded. LCMD is a lower cost complementary/augmentative component to forward-deployed BMD assets. The LCMD capability will augment current BMD systems and mitigate threat vulnerabilities to U.S. personnel and strategic assets. ***FY 2015 Accomplishments:*** Efforts focused on accelerating technology maturation and risk reduction. System design, performance and cost/value trade studies were conducted according to the LCMD analysis plan to refine and validate the system concept and assess the maturity of the required technology. High fidelity simulations and engineering analyses were developed to characterize detailed mission performance, integration interfaces with existing ballistic missile defense infrastructure, and the system's ability to address validated capability gaps. In addition, the maturity of three critical technology areas was advanced through additional detailed design work and component level testing. Technical coordination with the Missile Defense Agency and Ballistic Missile Defense program was initiated. The studies concluded the LCMD concept presents a promising approach to lowering threat ballistic missile engagement costs and is suitable for transition to a Critical Design Review phase. The analysis conducted in ECTD complements developmental research being conducted in Program Element 0603648D8Z. This effort will transition to Program Element 0603648D8Z in FY 2016.	3.500	-	-
Title: Long Endurance Airborne Platform (LEAP) ***Description:*** Long Endurance Airborne Platform (LEAP) provides a revolutionary, low-cost, low acoustic signature, persistent aerial Intelligence, Surveillance and Reconnaissance (ISR) capability by converting a proven, fuel-efficient Light Sport Aircraft into an Unmanned Aerial System (UAS). LEAP addresses the operational need for improved battlespace awareness in the USCENTCOM Area of Responsibility (AOR). ***FY 2015 Accomplishments:***	24.000	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The team completed flight testing for the LEAP design which has a takeoff weight of 1650 pounds, 30+ hours endurance, and carries a beyond-line-of-sight (BLOS) satellite communication (SATCOM) command and control/data relay capability along with full motion video, day/night imaging and radio direction finding payloads.			
Title: Multimodal Hostile Fire Detection System ***Description:*** The Multimodal Hostile Fire Detection System (MHFDS) integrated multiple hostile shot detection technologies through data fusion algorithms and ballistic models. The system conducted point-of-origin shot detection and classified threats in multi-shooter scenarios. This effort is a critical subsystem for the Rapid Reaction Technology Office's (RRTO) Remote Weapon Station (RWS) Auto Prioritization, Targeting, and Operator Cueing (RAPTOR) project. This effort will also transition proof of principle technologies, fulfilling a requirement for the Army Ground Based Operational Surveillance System (Expeditionary) (GBOSS(E)). ***FY 2015 Accomplishments:*** Demonstrated small arms multi-shooter detection, providing point-of-origin and weapon identification information. The MHFDS system was integrated with the RAPTOR system. ***FY 2016 Plans:*** Using prior year funding, development will focus on fusing detection signatures for small arms and large arms. A prototype ground demonstration is planned to evaluate the system's capability to detect and classify hostile fire in complex fire fights with multiple hostile engagements and support a transition decision for the U.S. Army.	2.500	0.000	-
Title: X-Lab ***Description:*** X-Lab will develop a robust architecture that will query numerous extremely large data sets to provide solutions to challenging problems. Initial work focused on leveraging data sets to provide early indications of activities leading to a terrorist or state-sponsored attack using weapons of mass destruction (WMD). X-Lab will develop and assess analytic methods and tools for finding and correlating multiple subtle signatures associated with biological WMD development and employment. Early detection and warning of precursor activities can enable intervention, earlier localization of response, and earlier deployment of countermeasures. ***FY 2015 Accomplishments:*** In FY 2015, X-Lab developed systems that automatically integrated and analyzed available image, signals and open source intelligence feeds. X-Lab implemented an infrastructure, process and analytic tools for detection of precursor activity related to the execution of a biological WMD attack. The capability was assessed with analysts operating in a Red-Blue game format. ***FY 2016 Plans:***	1.900	2.000	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The X-Lab architecture will expand to include access to additional live and archived classified and unclassified data sets to address other challenging problems. The X-Lab system will provide the first ever automated analysis of archived imagery and text data, and will provide advance indications and warnings of a simulated WMD attack in a demonstration for the Joint Staff and Joint Warfare Analysis Center as part of the Special Program for Missile Defeat.			
Title: Missile Defeat ***Description:*** The Missile Defeat effort will support the assessment and development of a suite of capabilities to address emergent strategic and tactical threats. The effort meets strategic goals as directed by the Office of the Under Secretary of Defense for Acquisition, Technology & Logistics (OUSD(AT&L)). The Missile Defeat addresses an operational need in the U.S. Strategic Command (USSTRATCOM) and U.S. Pacific Command (USPACOM) Areas of Responsibility. Details are classified. ***FY 2015 Accomplishments:*** The Missile Defeat effort started multiple projects in support of STRATCOM, PACOM, and the Joint Staff. These projects included beginning the development of initial, system engineering, and test/demonstration plans. Initial assessments were conducted and detailed modeling and simulation tools developed. Additionally, several technology development projects were supported or begun. Further details are classified. ***FY 2016 Plans:*** Using prior year funds, the Missile Defeat effort will develop an updated system architecture and demonstrate and assess new technologies for insertion into the updated architecture that addresses the operational needs of the U.S. Strategic Command (USSTRATCOM) and U.S. Pacific Command (USPACOM). Further details are classified.	11.250	0.000	-
Title: Remote Weapon Station (RWS) Auto Prioritization, Targeting, and Operator Cueing (RAPTOR) ***Description:*** The Remote Weapon Station (RWS) Auto Prioritization, Targeting, and Operator Cueing (RAPTOR) project will develop a prototype for a crew-served weapon system that will semi-autonomously detect, track, prioritize and engage multiple targets with operator determination. This is a joint effort in conjunction with representatives of the U.S. Army Armament Research, Development and Engineering Center (ARDEC), the Joint Non-Lethal Weapons Directorate (JNLWD) and the Office of Naval Research (ONR). These partner organizations will provide subsystems critical for RAPTOR functionality. The combined demonstration of multi-agency science and technology developments will serve to inform the Common Remotely Operated Weapon Station (CROWS) Program of Record. RAPTOR will also inform the development of a Joint Advanced Weapon Sensor System (JAWSS) Capability Development Document (CDD). ***FY 2015 Accomplishments:***	1.300	1.400	-

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All RAPTOR systems engineering was completed. Integration with the Multimodal Hostile Fire Detection System (MHFDS) and hardware components from partner organizations was initiated. ***FY 2016 Plans:*** The project will complete development of a man-in-the-loop, semi-autonomous Remote Weapon Station (RWS) capable of detecting, tracking, prioritizing and engaging multiple targets. The project will also coordinate partner organizations' technology development efforts to allow the execution of a combined demonstration in a hasty defense scenario. In addition to the planned final demonstration in FY 2016, RAPTOR will participate in additional exercises with the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC). The results of the FY 2016 demonstrations and exercises will inform a transition decision to the U.S. Army.			
Title: Battlespace Environmental Monitoring System (BEMS) ***Description:*** This project developed a system to detect radio frequency (RF) emissions in certain portions of the RF spectrum. Detection will inform the radiometer community in remote sensing programs on RF Interference sources, inform Department of Defense of emergent RF emitters and report unusual RF emission patterns that are detected in the environment. The project included the production and fielding of a distributed set of six units to three operational naval vessels that operate in high risk environments. Details of the project are classified. ***FY 2015 Accomplishments:*** BEMS completed design, fabricated systems and deployed on operational Navy ships. The system collected data that will inform the DoD and development community of emergent RF environment issues. No future Emerging Capabilities Technology Development funding has been planned; however, the Navy plans to expand capabilities to include direction finding and deploy additional systems to collect more detailed and comprehensive information on particular environments.	0.520	-	-
Title: Software Defined Radio Frequency Test System (Seeker) ***Description:*** The Software Defined Radio Frequency (RF) Test System, known as Seeker, will develop a rapidly reconfigurable test infrastructure and capabilities to address RF spectrum sharing, spectrum relocation and emergent RF spectrum denial and electronic attack capabilities. The Seeker project is part of ECTD's focus on missile defeat, aimed at addressing emergent strategic and tactical threats to ballistic missile defense and counter emerging weapons of mass destruction (WMD). Details of this project are classified. ***FY 2015 Accomplishments:*** System level design of RF Test Systems was completed for laboratory deployment. ***FY 2016 Plans:***	3.000	2.000	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Plans for FY 2016 are to develop prototype systems for assessment of U.S. capabilities in laboratory environments.			
Title: Stiletto Maritime Demonstration Program	2.500	2.500	2.500

Description: Stiletto is a technology demonstration and assessment asset developed to examine and explore emerging technologies and prototypes via a series of maritime technology demonstrations and other activities conducted by the Rapid Reaction Technology Office (RRTO) within the office of the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping (DASD(EC&P)). Stiletto is an 88-foot boat that serves as a maritime demonstration platform to assist in the assessment and development of prototypes and the rapid transition of emerging technologies across the range of military operations to higher technology readiness levels. Stiletto is an experimental, all carbon fiber craft. It was purposefully designed to rapidly acquire, integrate and employ new capabilities to explore the military utility and reduce the risk of emerging technologies and concepts of operation for special and expeditionary forces, interagency users and international partners. The Stiletto Maritime Demonstration Program offers a streamlined experimentation and demonstration process that encourages system developers to engage directly with the warfighter in the maritime environment to rapidly adapt technologies around operational needs. The Stiletto vessel is home-ported in Norfolk, Virginia.

FY 2015 Accomplishments:
The Stiletto Maritime Demonstration Program focused on autonomous capabilities, situational awareness, net-centric operations and electronic warfare/electronic protection technologies, demonstrating more than 60 technology prototypes. Stiletto conducted three capability demonstrations with operational commands and interagency partners, including Trident Spectre 2015, an interagency exercise focused on operations, intelligence, and technology fusion. Capability demonstrations included an assessment of maritime unmanned aerial vehicle (UAV) capabilities to support Naval Special Warfare and the United Kingdom Ministry of Defense stakeholders; a littoral operations center concept; and communications capabilities while on-the-move at sea. Demonstrations were conducted in partnership with the U.S. Navy, U.S. Coast Guard, U.S. Army, United States Special Operations Command (USSOCOM), United States Southern Command (USSOUTHCOM), the Intelligence Community and other operational users. Technology demonstration opportunities were offered to non-traditional businesses to help mature their systems and increase engagement with the warfighter in the development process. In FY 2015, Stiletto demonstrated 61 technologies, worked with nine small businesses, and achieved $2.5 million in cost avoidance to other government programs.

FY 2016 Plans:
The Stiletto Maritime Demonstration Program will continue to focus on emerging capabilities and threats and will execute capability demonstrations based on needs and priorities identified through engagement with stakeholders in the U.S. Navy, U.S. Coast Guard, U.S. Army, U.S. Marine Corps, USSOCOM, USSOUTHCOM, the Intelligence Community and other operational users. Focus areas for FY 2016 will include biometrics; electronic warfare; asymmetrical force application; autonomous systems; integration with undersea technologies; and, intelligence, surveillance and reconnaissance technologies. Three capability

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demonstrations are planned for FY 2016, including Trident Spectre 2016 and a joint demonstration with the Thunderstorm Demonstration Program. ***FY 2017 Plans:*** Stiletto will continue to focus on emerging capabilities and threats and will execute capability demonstrations based on needs and priorities identified through engagement with stakeholders in the U.S. Navy, U.S. Coast Guard, U.S. Army, U.S. Marine Corps, Geographic Combatant Commands, the Intelligence Community and other operational users.			
Title: Thunderstorm ***Description:*** This portfolio examines and explores emerging technologies and prototypes via a series of technology demonstrations and other activities conducted by the Rapid Reaction Technology Office within the office of the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping. Thunderstorm enhances interagency and international collaboration and provides the Department of Defense (DoD) and participating partners with an opportunity to evaluate and assess the capabilities of new and emerging technologies, primarily in the fields of air, space and intelligence, surveillance and reconnaissance (ISR). In addition, Thunderstorm provides an opportunity for technology developers to interact with a specific operational command and/or other government personnel to determine how specific efforts and systems may support or enhance warfighter capability needs. Technology developers are given the opportunity to demonstrate selected technologies in geographically and operationally relevant scenarios. Thunderstorm demonstration objectives, performance measures, lessons learned, post-demonstration assessments and data evaluation serve to inform future DoD technology investments and identify new capabilities and/or new ways to employ existing capabilities. ***FY 2015 Accomplishments:*** Thunderstorm Demonstration Program completed two table top exercises and two live technology demonstrations. The demonstrations included countering small unmanned aerial systems (UAS), Arctic challenges, detection of weapons of mass destruction (WMD) using UAS and anti-personnel landmine alternative technologies. Demonstrations were conducted in partnership with United States Northern Command (USNORTHCOM), United States Pacific Command (USPACOM), United States Special Operations Command (USSOCOM), Defense Threat Reduction Agency (DTRA), Army's Asymmetrical Warfare Group (AWG), Edgewood Chemical Biological Center (ECBC), Navy Expeditionary Combat Command (NECC), Naval Special Warfare Command, Naval Research Laboratory (NRL), U.S. Coast Guard, Department of Homeland Security (DHS), Federal Bureau of Investigation (FBI) and the Intelligence Community (IC). In FY 2015, Thunderstorm demonstrated a total of 28 technologies and worked with operational end users to pursue further research and development and transition opportunities for 11 technologies. ***FY 2016 Plans:***	2.500	2.500	2.500

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Thunderstorm spirals will build on the experience garnered from previous spirals. Focus areas will include physical security of critical port facilities, Counter Unmanned Underwater Vehicles (C-UUV), megacities/subterranean warfare, Arctic challenges and other priorities identified through engagement with stakeholders. A Thunderstorm spiral will be conducted in coordination with the Stiletto maritime demonstration platform. ***FY 2017 Plans:*** Thunderstorm will continue to reflect the most exigent challenges to DoD and provide a venue to explore new and innovative technological solutions. Focus areas will include Counter Unmanned Aerial Systems (C-UAS), Anti-Personal Landmine Alternatives (APL-A) and megacities/subterranean challenges.			
Title: Multi-Domain Demonstrations	1.500	1.500	1.500
Description: Multi-Domain Demonstrations will leverage existing demonstration venues and sites across the military Services to evaluate emerging technologies and prototypes at the system and individual component levels. Multi-domain demonstrations will focus on the integration of emerging capabilities across space, air, sea and ground domains, with specific attention to the recommendations of the Department's Long Range Research and Development Program Plan (LRRDPP). The sponsored demonstrations give non-traditional and other businesses easy access to realistic environments for informal evaluation of emerging technologies. The results of these evaluations enable improvements to prototype systems, inform the procurement process for future enhanced capabilities and alert operational users of capabilities in development. ***FY 2015 Accomplishments:*** Demonstrations were conducted with the Joint Experimental Range Complex at Yuma Proving Grounds, Arizona, to evaluate low-cost, small business-oriented technologies in the areas of autonomy, wearable electronics and tunnel detection capabilities. Documentation of more than 300 systems demonstrated since 2003 were consolidated in the Defense Technical Information Center (DTIC) database. ***FY 2016 Plans:*** Multi-domain demonstrations in FY 2016 will continue to support the Rapid Reaction Technology Office (RRTO) programs and DoD guidance resulting from the LRRDPP, such as emerging cross-domain technology, Arctic challenges, strategic security, electronic warfare, megacities challenges, and convergence assessments. Demonstrations will leverage existing venues within RRTO and across the military Services and DoD component organizations. Other priorities will be identified through engagement with stakeholders. ***FY 2017 Plans:***			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Multi-domain demonstrations in FY 2017 will continue to support RRTO programs and DoD guidance resulting from the LRRDPP. Demonstrations will leverage existing venues within RRTO and across the military Services and DoD component organizations. Other priorities will be identified through engagement with stakeholders.			
Title: Low Cost Innovative Projects	8.420	4.560	4.700
Description: Emerging Capabilities Technology Development (ECTD) funds supported several projects requiring less than one million dollars for execution. ECTD selected, executed and transitioned low cost projects in the areas of autonomous vehicles, maritime irregular warfare capabilities, countering violent extremism, persistent surveillance, low-cost, small footprint operations and other emerging technology areas. These projects delivered developmental prototypes for evaluation or assessment by warfighters and other interagency users. ***FY 2015 Accomplishments:*** •Spectral Management: Developed and tested camouflage materials in applicable global environments with currently fielded camouflage spectrum as a baseline. Finalized the spectral management camouflage specification in support of transition to Marine Corps Systems Command and the Army Program Executive Officer (PEO) Soldier. •Spatial Iris: Developed and fielded software for manual and digital mobile data collection of geospatial intelligence in austere environments by Department of Defense (DoD), interagency organizations and host nation partners. The software enables persistent domain awareness for transnational criminal identification, counterinsurgency work, humanitarian assistance/disaster relief, civil affairs and tracking trends and perceptions in high-threat countries with minimal cost and risk. The software will be transitioned to the Defense Threat Reduction Agency's (DTRA) Secure Unclassified Network (SUNet). •Humanitarian Assistance/Disaster Relief (HA/DR) Science & Technology Test Center: Completed development of a center for evaluating expeditionary and HA/DR technologies in a Southeast Asian tropical environment. The center supports U.S. Pacific Command (USPACOM) HA/DR Science & Technology (S&T) exercises and demonstrations. •Spar Tactical Sensor Mast: Delivered the prototype Spar ocean sensor buoy. Rapidly deployed the buoy and integrated the buoy with sensor systems from Naval Surface Warfare Center Dahlgren and commercial partners, and assessed performance during the Trident Spectre 2015 exercise at Fort Story, Virginia. Data from these demonstrations will be used by the Navy to support a transition decision. •Persistics Software Enhancement and Infrasonic Signal Association: These two projects developed and delivered systems in FY 2015 that automatically integrate and analyze available image, signals, and open source intelligence feeds to predict adversary behavior and track weapons of mass destruction in denied areas. Details are classified. •Two classified Maritime Disablement Operations prototypes were delivered and demonstrated. Both prototypes have transitioned to operational users.			

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•Warrior Resiliency Course: Initiated a program of psychology-based educational instruction that empowers Warfighters to take control of their stress reaction and increase unit readiness. Developed plans to provide instructor training to selected unit members, first responders and medical professionals; and develop mentored resiliency training to military members. •Electric-Vertical BAT (E-VBAT): E-VBAT unmanned aerial system (UAS) was delivered to Naval Sea Systems Command (NAVSEA) and transferred to Naval Air Systems Command (NAVAIR) for flight airworthiness certification in support of planned maritime launch and recovery demonstrations from Stiletto to support identified needs from stakeholders in the U.S. Navy, U.S. Marine Corps, U.S. Coast Guard and other government agencies in the areas of intelligence, surveillance and reconnaissance (ISR); data communications; and maritime disablement operations. The E-VBAT is a hybrid platform possessing the launch and recovery capabilities of a rotary wing aircraft and the endurance, range and payload capacity of a fixed wing ISR UAS. •Augmented Reality Clip-On (ARCO): Completed development, integration and testing of a heads-up display (HUD) that delivers day/night-time vision, thermal imaging, navigation and route planning capabilities. Prototypes were demonstrated during a limited user assessment with special operations forces (SOF) participation. The ARCO prototypes will directly transition to United States Special Operations Command (USSOCOM) Program Executive Office (PEO) SOF Warrior's Joint and Special Operations Program (JSOP) Program of Record and the U.S. Army PEO Soldier's Soldier Enhancement Program (SEP). In addition, ARCO informed follow-on Joint Special Operations Command (JSOC) science & technology development and acquisition. •Communications Modeling for Unattended Ground Sensors (UGS) Radio: Developed new capabilities for radio frequency mesh networking for intelligence collection in contested environments. During FY 2016, the mesh networking capability will be integrated into field ready UGS systems. •United Nations (U.N.) Peacekeeping Operations (PKO) Technology: Conducted two table top discussions regarding technologies that could be transitioned to support U.N. troop contributing countries and police contributing countries in changing peacekeeping operations. The table top exercises helped the team assess the needs and gaps in U.N. PKO missions. Based on the results of the table top exercises, the U.S. developed a prototype “book” of technologies for use by partner nations.			
FY 2016 Plans: Ongoing projects started in FY 2015 will be completed in FY 2016. FY 2016 Low Cost Innovative Projects will be selected in the year of execution in support of DoD Strategic Priorities and S&T objectives identified by the Assistant Secretary of Defense (Research and Engineering) (ASD(R&E)) and the Deputy Assistant Secretary of Defense (Emerging Capability & Prototyping) (DASD(EC&P)). • United Nations (U.N.) Peacekeeping Operations (PKO) Technology: In FY 2016, United States Southern Command (USSOUTHCOM) will provide guidance for the types of technologies that could be utilized in multi-national stabilization missions and will develop a test-bed for technologies recommended through this effort. A pilot project will demonstrate the utility of integrating proven DoD technologies to enhance planning capabilities for Multilateral Peacekeeping Operations, and improve DoD collaboration with the U.N. and other peacekeeping stakeholders.			

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•Warrior Resiliency Course: In FY 2016, this project will deliver a program of psychology-based educational instruction that empowers Warfighters to take control of their stress reaction and increase unit readiness. Instructor training to selected unit members, first responders and medical professionals will be completed; mentored resiliency training will be provided to military members as part of the pilot; and a web portal for the DoD focused on mitigating post-traumatic stress disorder (PTSD) will be completed. ***FY 2017 Plans:*** FY 2017 Low Cost Innovative Projects will be selected in the year of execution in support of DoD Strategic Priorities and S&T objectives identified by the ASD(R&E) and DASD(EC&P).			
Title: High Energy and Power Density Composites Focus Area ***Description:*** This focus area will develop scalable composite systems which are capable of high energy and power densities. Additional objectives will be to support the development of low-weight composite munitions that could increase the range and mission duration of unmanned aerial systems (UAS). ***FY 2016 Plans:*** Funding will be used to develop prototype scalable composite systems that could offer leap-ahead energy storage capabilities to advance deployable power and energy charging applications. Development of composite energy storage systems will drive advancements in high energy and power densities for multiple applications, including deployable pulse power devices and Unmanned Undersea Vehicle (UUV) charging stations. Other new projects in this focus area will develop prototype composite munitions systems for small UAS applications, enabling enhanced lethality from small modular weapon systems.	-	7.500	-
Title: Proof-of-Principle Prototyping ***Description:*** This project focuses on cost-effective, limited duration efforts to design, develop and deliver prototypes of cutting-edge land, sea, undersea, air and space systems to meet the Department's goal to drive innovation in aviation, space, maritime and ground combat systems in a fiscally constrained environment through advanced rapid prototyping. These prototypes will be delivered to joint and Service users to evaluate operational capabilities under realistic conditions and against current adversaries or anticipated threats. Potential venues for prototype assessment include assets such as the Stiletto Maritime Demonstration Program, Thunderstorm integration exercises and multi-domain demonstration venues across the Department of Defense (DoD). Knowledge and experience gained through those demonstrations will help develop new warfighting concepts and inform requirements and technical feasibility of future acquisition programs. These initial prototype efforts will help reduce the cost of future acquisition programs and stimulate efforts beyond traditional defense industrial base activities. Development of advanced prototypes will involve partnerships with industry and academia and permit operational users to gain insight into future technology-enabled strategies and tactics. Advanced rapid prototyping provides a mechanism to guard against technological	-	3.400	7.160

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surprise, preserve industrial base capabilities, impose asymmetric strategic costs on potential adversaries and explore innovative, technology-enabled military capabilities. ***FY 2016 Plans:*** Will test and model capabilities that will inform critical U.S. policy decisions on area denial and area effect munitions, develop the test infrastructure and capabilities to address radio frequency (RF) spectrum sharing, spectrum relocation and emergent RF spectrum denial and electronic attack capabilities. Develop the technical data package and design for a software reconfigurable radar that would provide a single very low cost, very low size, weight and power capability that is effective on multiple platforms against a wide range of targets. Conduct a realistic cyber and electronic warfare experiment to enable developers from industry and the labs to assess capabilities against reproductions of emergent threats in relevant environments. ***FY 2017 Plans:*** Projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop and deliver new concepts and technology prototypes aimed at supporting the Joint Force with critical enablers in force protection, lethality, robotics, human performance optimization, warfighter resilience, command & control, mobility and sustainment.			
Title: Electromagnetic Spectrum Agile Capability Focus Area ***Description:*** This portfolio will focus on cost-effective, mission-focused projects to design, develop and deliver new concepts and technology prototypes aimed at protecting DoD systems and extending capabilities across the electromagnetic spectrum. In the U.S. and allied nations, Department of Defense (DoD) communication and sensing capabilities are increasingly compromised by spectrum congestion and loss, as is evidenced by the recent radio frequency (RF) spectrum auction and the spectrum relocation fund. In other operational environments, emergent threats, technologies and tactics contest the use of RF spectrum and erode U.S. capabilities in ways that are difficult to predict and counteract. Prototypes from this focus area will address spectrum sharing, spectrum relocation and spectrum competition requirements, and will be evaluated under the electromagnetic (EM) conditions expected at home and abroad. Potential venues for prototype assessment include assets such as the Stiletto maritime demonstration program, Thunderstorm integration exercises and multi-domain demonstration venues across the DoD. Knowledge and experience gained through those demonstrations will help develop new warfighting concepts and inform requirements for future acquisition programs. These initial prototype efforts will help reduce the cost of future acquisition programs and stimulate efforts beyond traditional defense industrial base activities. Development of advanced prototypes will involve partnerships with industry and academia and permit operational users to gain insight into future technology-enabled strategies and tactics. ***FY 2015 Accomplishments:***	4.500	3.200	3.600

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Established EM Spectrum Consortium to explore technical solutions for the spectrum relocation and sharing required to accommodate the Advanced Wireless Services – 3 (AWS-3) RF spectrum auction. The consortium includes industry leaders from both the Defense and Telecommunications communities. This effort established an Other Transaction Authority (OTA) contracting mechanism with the EM Spectrum Consortium that will enable cooperative development of agile communications and sensing capabilities through the Office of Management and Budget/DoD Chief Information Officer's (OMB/DOD CIO) Spectrum Access Research and Development Program. This effort developed and assessed multiple RF collection and reproduction capabilities that permit the DoD to discover, analyze, quantify, prioritize and test against emergent RF threats and poorly understood EM environments. ***FY 2016 Plans:*** This focus area will be used to develop wideband free space optics (FSO) communication network to augment United States Marine Corps (USMC) tactical RF communications capabilities. The program will develop and advise laboratories that can simulate competitive EM environments and emergent EM threats for industrial and laboratory technology assessments. Funding will be used to develop concepts and designs that will result in prototype next generation electronic warfare, communications and RF sensing capabilities in one to three years. While project determinations are generally made in the year of execution, projects to be considered will identify and analyze EM threats and provide capabilities that will enable DoD systems to operate effectively in the congested EM environments at home and the contested EM environments expected in future contingency operations. Three to four prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. ***FY 2017 Plans:*** Projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop and deliver new concepts and technology prototypes aimed at protecting DoD systems and extending capabilities across the electromagnetic spectrum. Three to four prototype efforts are anticipated in FY 2017 leveraging joint, Service and interagency partnerships.			
Title: Counter-Weapons of Mass Destruction Focus Area	-	3.020	8.145
Description: This focus area for FY 2016 and FY 2017, in anticipation of emerging needs, will include the development and advancement of prototype technologies that focus on the detection and interdiction of chemical, biological, radiological, nuclear and high yield explosives threats. Projects may include techniques and methodologies that improve detection sensitivities, persistent intelligence, surveillance and reconnaissance (ISR), tagging and tracking technologies, data analysis tools and global situational awareness. Efforts will support the Department of Defense (DoD) strategy for countering weapons of mass destruction (WMD) by developing and demonstrating active and passive defenses that address both known threats and potential surprises in adversaries' WMD technology and employment methods, particularly those that could present challenges to existing countermeasures. The constant evolution of WMD materials, tactics and technologies calls for the development of flexible and innovative solutions that leverage the full range of DoD and interagency tools and capabilities. Capabilities that support these			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
tasks include detection; modeling; detailed operational planning; and analysis of materials, precursors and agents that may be related to a proliferation activity, an adversary's developmental or fielded capability or the actual use of WMD. Prototypes developed in this focus area will be delivered to joint and Service users to evaluate operational capabilities under realistic conditions and against current adversaries or anticipated threats. Potential venues for prototype assessment include assets such as Thunderstorm integration exercises and multi-domain demonstration venues across DoD. Development of advanced prototypes will involve partnerships with industry and academia and permit operational users to gain insight into future technology-enabled strategies and tactics. ***FY 2016 Plans:*** Plans for FY 2016 include pursuing development of concepts and designs that will result in innovative concept of operations (CONOPS) and prototype systems in one to three years. FY 2016 projects include data mining for indications and warnings of a WMD attack and unattended Measurement and Signature Intelligence (MASINT) sensors to provide situational awareness of WMD activities in denied areas. While project determinations are generally made in the year of execution, projects to be considered include prototypes and demonstrations of capabilities to detect early indications of activities leading to a terrorist or state-sponsored attack using WMD. Other potential projects will focus on advances in the DoD's ability to locate, secure, monitor, tag, track, interdict, eliminate and attribute WMD weapons and materials. Two to three prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. Three to four prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. ***FY 2017 Plans:*** Projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop, and deliver new concepts and technology prototypes aimed at supporting the Joint Force with critical enablers in force protection, lethality, robotics, human performance optimization, warfighter resilience, command & control, mobility and sustainment. Five to six prototype efforts are anticipated in FY 2017 leveraging joint, Service and interagency partnerships.			
Title: Missile Defeat Focus Area ***Description:*** Building on the lessons learned from the Low Cost Missile Defeat Prototype project, this focus area will pursue low cost, innovative counters to ballistic and cruise missile threats. The missile defeat focus area will aim to improve and expand homeland and regional missile defenses and invest in advanced technology development and future capabilities to counter the increasingly complex threat. The missile defeat focus area will address emergent strategic and tactical threats from cruise and ballistic missiles. This focus area is aimed at developing prototype technologies and demonstrations of advanced sensors and capabilities to support persistent discrimination, common kill vehicle technology, autonomous and integrated interceptors, and Command, Control, Battle Management and Communications (C2BMC).	-	2.172	5.833

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603699D8Z / *Emerging Capabilities Technology Development*	**Project (Number/Name)** P795 / *Emerging Capabilities Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2016 Plans: Plans for FY 2016 are to increase the capability of our ballistic missile defense system by developing and fielding capabilities for protection against attack from ballistic and cruise missiles. Projects like Seeker will address radio frequency (RF) spectrum sharing, spectrum relocation and emergent RF spectrum denial and electronic attack capabilities. Three to four prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. ***FY 2017 Plans:*** FY 2017 projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop, and deliver new concepts and technology prototypes aimed at supporting the Joint Force with counters to ballistic and cruise missile threats. The focus will be on low-cost, innovative capabilities. Five to six prototype efforts are anticipated in FY 2017 leveraging joint, Service and interagency partnerships.			
Title: Multi-domain Autonomous Systems Focus Area	-	3.157	8.115
Description: This portfolio will focus on cost-effective, mission-focused projects to design, develop, and deliver technology prototypes of cutting edge multi-domain, autonomous systems to meet the Department's goal to drive innovation in aviation, space, maritime and ground combat systems. Autonomous systems range from software to aid the intelligence analyst in processing, exploitation and dissemination, through very complex autonomous air systems networked in tandem with unmanned ground or undersea vehicles. The technologies associated with autonomy are multiplying: from sensors that can understand the environment, to software algorithms that can make a decision or seek human assistance. Through autonomy, the Department of Defense (DoD) will reduce the manpower required to safely conduct missions. Multi-domain, autonomous systems developed and demonstrated through this focus area will seek to enhance the capabilities of unmanned systems to enable missions across air, sea, land and space environments and advance the state-of-the-art in cooperative behaviors among autonomous systems, such as unmanned Aerial systems, unmanned ground combat vehicles, unmanned underwater vehicles and unmanned surface vehicles. These prototypes will be delivered to joint and Service users to evaluate operational capabilities under realistic conditions and against current adversaries or anticipated threats. Potential venues for prototype assessment include the Stiletto maritime demonstration program, Thunderstorm integration exercises and the Joint Experimental Range Complex (JERC). Knowledge and experience gained through those demonstrations will help develop new warfighting concepts and inform requirements and technical feasibility of future acquisition programs. Development of advanced autonomous systems prototypes will involve partnerships with industry and academia and permit operational users to gain insight into future technology-enabled strategies and tactics. ***FY 2016 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603699D8Z / *Emerging Capabilities Technology Development*	**Project (Number/Name)** P795 / *Emerging Capabilities Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Plans for FY 2016 include pursuing development of concepts and designs that will result in innovative concept of operations and prototype systems in one to three years. While project determinations are generally made in the year of execution, projects to be considered will look at science and technology to achieve autonomous systems that reliably and safely accomplish complex tasks in all environments. Projects under consideration include low-cost, multi-mission prototypes to detect and defeat unmanned aerial system (UAS) threats and prototype systems with autonomous behaviors to accelerate kill chains. Three to four prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. ***FY 2017 Plans:*** FY 2017 projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop and deliver new concepts and technology prototypes aimed at achieving autonomous systems that reliably and safely accomplish complex tasks, in all environments, or protect DoD assets from unmanned, autonomous threats. Five to six prototype efforts are anticipated in FY 2017 leveraging joint, Service, and interagency partnerships.			
Title: Dismounted Soldier Systems Focus Area	-	2.040	5.842
Description: This portfolio will focus on cost-effective, mission-focused projects to design, develop and deliver prototypes of cutting-edge dismounted soldier systems. These systems will support the Joint Force with critical enablers in force protection, lethality, robotics, human performance optimization, command & control, mobility and sustainment. Technology development will counter emergent threats to the warfighter both while en-route to and operating within expeditionary environments alongside unified action partners. Force support capabilities that offer the dismounted personnel enhanced situational awareness, communications, data to decisions, and energy and power sources will be explored through this focus area. Prototypes will be delivered to joint and Service users to evaluate operational capabilities under realistic conditions and against current adversaries or anticipated threats. Potential venues for prototype assessment include assets such as the Stiletto Maritime Demonstration Program, Thunderstorm integration exercises and multi-domain demonstration venues across the Department of Defense (DoD). Knowledge and experience gained through those demonstrations will help develop new warfighting concepts and inform requirements and technical feasibility of future acquisition programs. These initial prototype efforts will help reduce the cost of future acquisition programs and stimulate efforts beyond traditional defense industrial base activities. Development of advanced prototypes will involve partnerships with industry and academia and permit operational users to gain insight into future technology-enabled strategies and tactics. ***FY 2016 Plans:*** Plans for FY 2016 include pursuing development of concepts and designs that will result in innovative concept of operations and prototype systems in one to three years. While project determinations are generally made in the year of execution, projects to be considered will look at dismounted soldier systems that support the Joint Force with critical enablers in force protection, lethality, robotics, human performance optimization, warfighter resilience, command & control, mobility and sustainment. Potential projects			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603699D8Z / *Emerging Capabilities Technology Development*	**Project (Number/Name)** P795 / *Emerging Capabilities Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
include the development of a prototype dismount portable, 20 watts solid state combustor that generates electric power from high energy density liquid fuels with no moving parts and development of a prototype unimproved Landing Zone soil assessment system that will cut the time to assess a new landing zone in half, and significantly reduce risk for dismounted advance teams in hostile environments. Two to three prototype efforts are anticipated in FY 2016 leveraging joint, Service and interagency partnerships. ***FY 2017 Plans:*** FY 2017 projects will be selected in the year of execution. Projects to be considered will support DoD Research and Engineering Enterprise Strategic Priorities and will focus on cost-effective, mission-focused projects to design, develop and deliver new concepts and technology prototypes aimed at supporting the Joint Force with critical enablers in force protection, lethality, robotics, human performance optimization, warfighter resilience, command & control, mobility and sustainment. Four to five prototype efforts are anticipated in FY 2017 leveraging joint, Service and interagency partnerships.			
Accomplishments/Planned Programs Subtotals	68.640	40.949	49.895

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In FY 2017, generic performance metrics applicable to Emerging Capabilities Technology Development include transition of 40 percent of completing demonstrations program per year. In addition, project completions and success are monitored against schedules and deliverables stated in the proposals and statements of work. The metrics include items such as target dates, production measures and demonstration goals. In FY 2015, Emerging Capabilities Technology Development achieved a transition rate of approximately 78 percent.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603716D8Z / *Strategic Environmental Research and Development Program (SERDP)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	183.492	54.357	55.705	65.078	-	65.078	69.961	75.779	76.870	78.409	Continuing	Continuing
P470: *Strategic Environmental Research and Development Program (SERDP)*	183.492	54.357	55.705	65.078	-	65.078	69.961	75.779	76.870	78.409	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congress established the Strategic Environmental Research and Development Program (SERDP) in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns. It is conducted as a DoD program, jointly planned and executed by the DoD, DOE, and the Environmental Protection Agency (EPA), with strong participation by other Federal agencies, industry, and academia. SERDP`s objective is to improve DoD mission readiness and environmental performance by providing new scientific knowledge and cost-effective technologies in the areas of Environmental Restoration, Munitions Response, Resource Conservation and Climate Change, and Weapons Systems and Platforms. SERDP does this by addressing high priority DoD environmental technology requirements. SERDP enhances military operations, improves military systems` effectiveness, enhances military training/readiness, sustains DoD's training and test ranges and installation infrastructure, and helps ensure the safety and welfare of military personnel and their dependents by eliminating or reducing the generation of pollution and use of hazardous materials and reducing the cost of remedial actions and compliance with environmental laws and regulations. As a secondary benefit, SERDP helps solve significant national and international environmental problems. The keys to a growing list of SERDP technological successes are the ability to respond aggressively and proactively to priority defense environmental needs; the pursuit of world-class technical excellence; and an emphasis on constant technology transfer.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	57.714	65.836	69.905	-	69.905
Current President's Budget	54.357	55.705	65.078	-	65.078
Total Adjustments	-3.357	-10.131	-4.827	-	-4.827
• Congressional General Reductions	-	-10.000			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.022	-0.131			
• SBIR/STTR Transfer	-1.335	-			
• Realignment	-	-	-4.324	-	-4.324
• Economic Assumptions Adjustment	-	-	-0.503	-	-0.503

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603716D8Z *I Strategic Environmental Research and Development Program (SERDP)*

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603716D8Z / *Strategic Environmental Research and Development Program (SERDP)*	**Project (Number/Name)** P470 / *Strategic Environmental Research and Development Program (SERDP)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P470: *Strategic Environmental Research and Development Program (SERDP)*	183.492	54.357	55.705	65.078	-	65.078	69.961	75.779	76.870	78.409	Continuing	Continuing

A. Mission Description and Budget Item Justification

Congress established the Strategic Environmental Research and Development Program (SERDP) in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns. It is conducted as a DoD program, jointly planned and executed by the DoD, DOE, and the Environmental Protection Agency (EPA), with strong participation by other Federal agencies, industry, and academia. SERDP`s objective is to improve DoD mission readiness and environmental performance by providing new scientific knowledge and cost-effective technologies in the areas of Environmental Restoration, Munitions Response, Resource Conservation and Climate Change, and Weapons Systems and Platforms. SERDP does this by addressing high-priority DoD environmental technology requirements. Technologies developed by SERDP enhance military operations, improve military systems' effectiveness, enhance military training/ readiness, sustain DoD's training and test ranges and installation infrastructure, and help ensure the safety and welfare of military personnel and their dependents by eliminating or reducing the generation of pollution and use of hazardous materials and by reducing the cost of remedial actions and compliance with environmental laws and regulations. As a secondary benefit, SERDP helps solve significant national and international environmental problems. The keys to a growing list of SERDP technological successes are the ability to respond aggressively and proactively to priority defense environmental needs; the pursuit of world-class technical excellence; and an emphasis on constant technology transfer.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Environmental Restoration	13.512	13.846	16.238
Description: Environmental Restoration (ER) reduces DoD's liabilities by developing technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water.			
FY 2015 Accomplishments: Research initiatives focused on the highest priority DoD requirements to reduce DoD's liabilities by developing technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water. A Statement of Need was released and projects selected for funding that address improved understanding of long term natural attenuation processes on contaminants in groundwater. Details are available at www.serdp-estcp.org.			
FY 2016 Plans: New research initiatives will focus on the highest priority DoD requirements to reduce DoD's liabilities by developing technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water. Specific Statements of Need were released and proposals are being selected that will address: 1) Measurement and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603716D8Z / *Strategic Environmental Research and Development Program (SERDP)*	**Project (Number/Name)** P470 / *Strategic Environmental Research and Development Program (SERDP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Enhancement of Abiotic Attenuation Processes in Groundwater, 2) Ecotoxicity of Perfluorinated Compounds, and 3) Improved Understanding of Particle Deposition from Low-Order Detonations of High Explosive Munitions. Details are available at www.serdp-estcp.org. ***FY 2017 Plans:*** New research initiatives will focus on the highest priority DoD requirements to reduce DoD's liabilities by developing technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water.			
Title: Munitions Response (MR) ***Description:*** Munitions Response (MR) develops detection, classification, and remediation technologies for Unexploded Ordnance (UXO) to address the significant DoD liability in the Military Munitions Response Program. Investments are also made to improve active range clearance and to reduce generation of UXO during live fire testing and training operations. ***FY 2015 Accomplishments:*** Research initiatives focused on the highest priority DoD requirements in underwater UXO detection and classification, including wide area and detailed surveys; cost-effective recovery and disposal; characteristics of munitions underwater and their environment; and protocols to reduce the costs associated with detecting and remediating UXO underwater. A Statement of Need was released and projects selected for funding that address these issues. Details are available at www.serdp-estcp.org. ***FY 2016 Plans:*** New research initiatives will focus on the highest priority DoD requirements in underwater UXO detection and classification and protocols to reduce the costs associated with detecting and remediating UXO underwater. A Statement of Need was released and proposals are being selected to address these issues. Details are available at www.serdp-estcp.org. ***FY 2017 Plans:*** New research initiatives will focus on the highest priority DoD requirements in underwater UXO detection and protocols to reduce the costs associated with detecting and remediating UXO underwater.	8.145	8.347	11.063
Title: Resource Conservation and Climate Change (RC) ***Description:*** Resource Conservation and Climate Change (RC) develops the science and technologies required to sustain training and testing ranges. ***FY 2015 Accomplishments:*** Research initiatives focused on the highest priority DoD requirements to develop the science and technologies required to sustain training and testing ranges and respond to requirements in the 2014 Quadrennial Defense Review (QDR), including the	17.681	18.120	19.630

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603716D8Z / *Strategic Environmental Research and Development Program (SERDP)*	**Project (Number/Name)** P470 / *Strategic Environmental Research and Development Program (SERDP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
assessment of climate change impacts to DoD installations. Specific Statements of Need were released and projects selected for funding that address new paradigms for managing species and ecosystems in a non-stationary world and adapting to changes in the hydrologic cycle under non-stationary climate conditions. Details are available at www.serdp-estcp.org. ***FY 2016 Plans:*** New research initiatives will focus on the highest priority DoD requirements to develop the science and technologies required to sustain training and testing ranges and respond to requirements in the 2010 QDR, including the assessment of climate change impacts to DoD installations. Specific Statements of Need were released and proposals are being selected for funding to address: 1) Changes in Pathogen Exposure Pathways under Non-Stationary Conditions and Their Implications for Wildlife and Human Exposure on Department of Defense Lands and 2) Improved Understanding of Wildland Fire Combustion Processes for Department of Defense Managed Ecosystems. Details are available at www.serdp-estcp.org. ***FY 2017 Plans:*** New research initiatives will focus on the highest priority DoD requirements to develop the science and technologies required to sustain training and testing ranges and respond to requirements in the 2014 QDR, including the assessment of climate change impacts to DoD installations.			
Title: Weapons Systems and Platforms (WP) ***Description:*** Weapons Systems and Platforms (WP) develops technologies and materials that reduce the waste and emissions associated with the manufacturing, maintenance, and use of DoD weapons systems and platforms to reduce future environmental liabilities and their associated costs and impacts. ***FY 2015 Accomplishments:*** Research focused on the highest priority DoD requirements to develop technologies and materials that reduce the waste and emissions associated with the manufacturing, maintenance, and use of DoD weapons systems and platforms to reduce future environmental liabilities and their associated costs and impacts. Specific Statements of Need were released and projects selected for funding that address sustainable gasless delay formulations and standardized test methodologies for low observable coating durability. Details are available at www.serdp-estcp.org. ***FY 2016 Plans:*** New research initiatives will focus on the highest priority DoD requirements to develop technologies and materials that reduce the waste and emissions associated with the manufacturing, maintenance, and use of DoD weapons systems and platforms to reduce future environmental liabilities and their associated costs and impacts. Specific Statements of Need were released and proposals are being selected for funding to address: 1) Data to Improve Understanding of the Source and Mechanism of Full Scale Military Tactical Aircraft Engine Noise, 2) Reducing or Eliminating HAPs and VOCs from Polyurethane Rain Erosion	15.019	15.392	18.147

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603716D8Z / *Strategic Environmental Research and Development Program (SERDP)*	**Project (Number/Name)** P470 / *Strategic Environmental Research and Development Program (SERDP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Coatings, 3) Environmentally Sustainable Manufacturing for Energetic Formulations, and 4) Alternatives for Chromium and Nickel Plating in Repair Operations. Details are available at www.serdp-estcp.org. ***FY 2017 Plans:*** New research initiatives will focus on the highest priority DoD requirements to develop technologies and materials that reduce the waste and emissions associated with the manufacturing, maintenance, and use of DoD weapons systems and platforms to reduce future environmental liabilities and their associated costs and impacts.			
Accomplishments/Planned Programs Subtotals	54.357	55.705	65.078

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance in this program is monitored at two levels. At the lowest level, each of the more than 160 individual projects is measured against both technical and financial milestones on a quarterly and annual basis. At a program-wide level, progress is measured against DoD's environmental requirements and the development of technologies that address these requirements as well as the transition of these technologies to either to demonstration and validation programs or to direct use in the field.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603727D8Z / *Joint Warfighting Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	20.936	10.108	4.982	7.848	-	7.848	8.357	9.035	9.159	9.337	Continuing	Continuing
P727: *Joint Warfighting*	20.936	10.108	4.982	7.848	-	7.848	8.357	9.035	9.159	9.337	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Warfighting Program (JWP) is a pivotal resource that synchronizes two Department-wide domains, military requirements and acquisition, with shared analyses and actionable assessments. JWP supports partnership for customers including joint command staffs, the Joint Staff, and OSD elements responsible for oversight of Components equipping forces for joint missions. The account underwrites limited-scope analyses, experiments, and partnerships that define joint capability gaps and develop actionable requirements for follow-on acquisition efforts. This program element plays a major role in portfolio assessments aiming to identify critical gaps between Service-generated capabilities and suggest affordable solutions. JWP funds venues for demonstration of emergent technology-based prototypes that enable joint customers to draft requirements based on realistic understanding of feasible solutions. JWP specifically aims to assist joint-end-users by analyses that identify essential capability improvements as actionable joint military needs expressed as specific Key Performance Parameters (KKPs) and Key System Attributes (KSAs). These analyses and assessments deliver independent perspectives on ways to align Service and Agency investments and potential solutions for capability gaps created by evolving threats not aligned to single Component missions. Though a relatively modest program, JWP is consistently cited by joint combatant commanders' staffs as the seminal infusion of funding that spawned insightful demonstrations, theater centers of excellence, mission essential capability modifications and strategic concepts. JWP also underwrites staff analyses in the Acquisition, Technology & Logistics staff of the Office of the Secretary of Defense (OSD). Working with Service, OSD and joint command counterparts, the AT&L staff performs portfolio assessments focusing on warfighting environments ten to twenty years ahead.

Typical projects funded with JWP include translation of capability gap assessments into actionable military needs statements, identification of candidate solutions via experimentation, translation of solution concepts into field demonstrations, and remedy of joint capability gaps in partnership with Defense agents for doctrine changes and technology development. JWP resources dedicated to direct support joint commands provides analytic expertise not normally allocated via formal staffing billets. In this activity, JWP underwrites small grants to invigorate employment of experimentation and analysis, to formulate strategies to resolve joint capability gaps, and to stimulate participation in the Department enterprises for joint experimentation and joint capability development. JWP resources also support Mission Area Portfolio Assessments (MAPA), and the development of tools supporting joint analytic efforts.

The balance of JWP funds contributes resources to examination of potential remedies for joint mission capability gaps. In many cases, JWP funds initiatives for process improvements serving all Components, but aligned with no single Service or Agency. These early assessments of potential capability gap solutions can accelerate engineering development, subsequent field experiments, and capability demonstrations in field conditions. This segment of JWP often represents the first effort to define integrated and innovative solutions across the range of Doctrine, Organization, Training, Material, Leadership and Personnel-Facilities. The resources sustain a small segment of civilian operation research analysis (currently hosted by the Institute for Defense Analysis – IDA and the Naval Postgraduate School - NPS). Administered by the Joint Operations Support (JOS) division within OSD's AT&L organization, JOS works closely and continuously with joint customers around the world. Analytic project selection is undertaken in consultation with the OSD staffs serving AT&L and Policy and with elements of the Joint Staff. On a modest funding base, JWP forges collaborative efforts across joint staffs to cement alliances attacking tough DoD-wide issues like ISR, cyber and UAS.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603727D8Z *I Joint Warfighting Program*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	5.396	9.626	7.936	-	7.936
Current President's Budget	10.108	4.982	7.848	-	7.848
Total Adjustments	4.712	-4.644	-0.088	-	-0.088
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.626			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.828	-			
• SBIR/STTR Transfer	-0.116	-			
• Economic Assumptions	-	-	-0.061	-	-0.061
• FY16 FFRDC	-	-0.018	-	-	-
• Fiscal Guidance Adjustment	-	-	-0.027	-	-0.027

Change Summary Explanation

Significant changes in FY15 funds for the JWP account resulted from a one-time commitment of funding to support "Information Technology (IT) enhancements for a dynamic targeting cell". This initiative aimed to update capabilities for the Pacific Command Area of Responsibilities (PACOM AoR). Also, FY16 is reflective of a congressional reduction for prior year carryover.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense											Date: February 2016	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603727D8Z / *Joint Warfighting Program*				Project (Number/Name) P727 / *Joint Warfighting*			
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
P727: *Joint Warfighting*	20.936	10.108	4.982	7.848	-	7.848	8.357	9.035	9.159	9.337	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Warfighting Program (JWP) is a pivotal resource that synchronizes two Department-wide domains, military requirements and acquisition, with shared analyses and actionable assessments. JWP supports partnership for customers including joint command staffs, the Joint Staff, and OSD elements responsible for oversight of Components equipping forces for joint missions. The account underwrites limited-scope analyses, experiments, and partnerships that define joint capability gaps and develop actionable requirements for follow-on acquisition efforts. This program element plays a major role in portfolio assessments aiming to identify critical gaps between Service-generated capabilities and suggest affordable solutions. JWP funds venues for demonstration of emergent technology-based prototypes that enable joint customers to draft requirements based on realistic understanding of feasible solutions. JWP specifically aims to assist joint-end-users by analyses that identify essential capability improvements as actionable joint military needs expressed as specific Key Performance Parameters (KKPs) and Key System Attributes (KSAs). These analyses and assessments deliver independent perspectives on ways to align Service and Agency investments and potential solutions for capability gaps created by evolving threats not aligned to single Component missions. Though a relatively modest program, JWP is consistently cited by joint combatant commanders' staffs as the seminal infusion of funding that spawned insightful demonstrations, theater centers of excellence, mission essential capability modifications and strategic concepts. JWP also underwrites staff analyses in the Acquisition, Technology & Logistics staff of the Office of the Secretary of Defense (OSD). Working with Service, OSD and joint command counterparts, the AT&L staff performs portfolio assessments focusing on warfighting environments ten to twenty years ahead.

Typical projects funded with JWP include translation of capability gap assessments into actionable military needs statements, identification of candidate solutions via experimentation, translation of solution concepts into field demonstrations, and remedy of joint capability gaps in partnership with Defense agents for doctrine changes and technology development. JWP resources dedicated to direct support joint commands provides analytic expertise not normally allocated via formal staffing billets. In this activity, JWP underwrites small grants to invigorate employment of experimentation and analysis, to formulate strategies to resolve joint capability gaps, and to stimulate participation in the Department enterprises for joint experimentation and joint capability development. JWP resources also support Mission Area Portfolio Assessments (MAPA), and the development of tools supporting joint analytic efforts.

The balance of JWP funds contributes resources to examination of potential remedies for joint mission capability gaps. In many cases, JWP funds initiatives for process improvements serving all Components, but aligned with no single Service or Agency. These early assessments of potential capability gap solutions can accelerate engineering development, subsequent field experiments, and capability demonstrations in field conditions. This segment of JWP often represents the first effort to define integrated and innovative solutions across the range of Doctrine, Organization, Training, Material, Leadership and Personnel-Facilities. The resources sustain a small segment of civilian operation research analysis (currently hosted by the Institute for Defense Analysis – IDA and the Naval Postgraduate School - NPS). Administered by the Joint Operations Support (JOS) division within OSD's AT&L organization, JOS works closely and continuously with joint customers around the world. Analytic project selection is undertaken in consultation with the OSD staffs serving AT&L and Policy and with elements of the Joint Staff. On a modest funding base, JWP forges collaborative efforts across joint staffs to cement alliances attacking tough DoD-wide issues like ISR, cyber and UAS.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603727D8Z / *Joint Warfighting Program*	**Project (Number/Name)** P727 / *Joint Warfighting*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Support for Joint Capability Analysis	3.763	2.989	4.709

Description: JWP resources are dedicated to analytic support for joint capability analysis and joint customers. JWP supports joint capabilities by promoting analyses and assessments to address challenges specific to their theater or functional missions. It aims to reinvigorate joint military staff capabilities to employ rigorous analysis and experimentation methodologies in support of specific mission assignments. It supports joint commander identification of capability gaps and selectively funds limited objective experiments experiment to understand a concept or technology that addresses a specific joint mission challenge. JWP also resources Mission Area Portfolio Assessments (MAPA) serving the need of joint capability clients.

FY 2015 Accomplishments:
JWP funding stimulated additional government investors in Air Force technical investigation of options for advanced jet engine design. Continuing a multi-year engagement, JWP funded a Joint Capability Engineering Architecture study delivering a detailed mapping of "Joint Suppression of Enemy Air Defenses (JSEAD) Electronic Attack and Conventional Attack within Complex Anti-Access/Area Denial (A2/AD) Environments". This analysis focused on warfighting technologies (US and potential adversary systems) found in the Pacific Area of Operations. This architecture serves as the framework for comparative analyses, modeling & simulation, and assessment of potential solutions for capability gaps. The Joint Personnel Recovery Agency (JPRA) benefitted from JWP-funded analysis of innovative acquisition solutions to phased replacement of radios used for escape and evasion missions. Acquisition, Technology & Logistics (AT&L) pursued Mission Area Portfolio Assessments with JWP funding to generate cross-cutting assessments of Service capabilities that will inform next generation acquisition investments. AT&L also applied JWP funding to initiate "Big Data" tools aimed at reducing recurrent acquisition program reporting while providing near real time program status information across the Acquisition Enterprise. JWP funding also united AT&L with the Joint Staff to examine a "Capability Mix Dynamics" study producing insights into capabilities and gaps associated with space-based intelligence sensors.

FY 2016 Plans:
Two major efforts will receive JWP funding in FY 2016. Cross-service efforts by the Navy and the Air Force will receive participatory funding to develop technical specifications for the next generation of a Combat Search and Evasion Location communications. More than an effort to create multi-Service technical solutions, this investment underwrites an innovative acquisition approach aiming to incentivize industry participation in a rapid, lower cost alternative to traditional acquisition programs of record. JWP funding will also support AT&L initiatives to partner with US Central Command and US Special Operations Command to develop technical options tailored to evolving military demands from our operations to counter ISIL.

FY 2017 Plans:
Continue emphasis on Mission Area Portfolio Assessment (MAPA) to provide insights for acquisition decisions focused on capability development serving the needs of joint commanders and joint clients. Provide direct analytical support responding to emergent joint military staffs to identify capability gaps and military needs for material solutions. Continue to support Joint

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603727D8Z / *Joint Warfighting Program*	**Project (Number/Name)** P727 / *Joint Warfighting*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Interagency Field Experimentation (JIFX) effort hosted by Naval Postgraduate School. Support joint commanders to develop and refine capability requirements. Continue to partner with joint military staffs, encouraging experimentation cells to address mission capability gaps, explore potential solutions, and improve understanding of new technologies and concepts in response to evolving missions and military threats. Empower the joint military staffs to employ rigorous analysis and experimentation methodologies.			
Title: Analytic Development of Joint Military Requirements Addressing Evolving Threats / Missions	6.345	1.993	3.139
Description: This segment underwrites innovative, responsive and timely analytic support on joint capability development serving the needs of joint warfighters in partnership with senior acquisition staffs. It provides an independent source to examine potential remedies for mission capability gaps and can establish a framework for subsequent field experiments, capability demonstrations or accelerated acquisition. Joint warfare independent analysis often represents the first effort to define alternative solutions across the range of Doctrine, Organization, Training, Material, Leadership and Personnel-Facilities. Administered by the Joint Operations Support cell within OSD/AT&L, this fund capability gap definition and technology based initiatives. Project selection is undertaken in consultation with the OSD staffs serving Acquisition, Technology, and Logistics (AT&L) and Policy and with elements of the Joint Staff.			
FY 2015 Accomplishments: Investments in joint capability analysis aimed to stimulate partnerships on a wide variety of topics. Principle sponsorship of the Joint Interagency Field Experiment (JIFX) series conducted by the Naval Postgraduate School provides unique opportunities for Services and joint commands to examine developmental technical advances offering potential solutions to specific capability gaps. The Deputy Secretary of Defense praised JIFX as a venue attuned to the Department's outreach for innovation from corporate partners, universities, and non-traditional technologists. JWP of analysis investment focused on countermeasures for emergent ballistic missile threats in the Pacific Command (USPACOM) Area of Responsibility. A Department-wide initiative led by Under Secretary of Defense (Acquisition, Technology & Logistics) is assessing evolving threats and generating innovative approaches to countering potential adversaries. Funding also underwrote pathfinding efforts by USPACOM to integrate cyber warfare techniques and tactics into operational and tactical military efforts. This investment partially offset technical staff costs for a theater center that serves the dual purpose of training and innovative experimentation in combined cyber/conventional operations. A small incremental investment from this fund supported an effort with the Joint Staff to explore alternative architectures for distribution of data from Airborne Intelligence, Surveillance and Reconnaissance (AISR) sensors. Steeply increasing demand for information from AISR sensors places a strain on existing data exchange networks serving Combatant Commands. This study examined potential infrastructure investments to increase network capacity apace with demand for connectivity. Joint Warfighting Program funds also supported efforts by Transportation Command to improve protection of their critical networks and data from cyber intrusion.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603727D8Z / *Joint Warfighting Program*	**Project (Number/Name)** P727 / *Joint Warfighting*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
JWP will continue to support analytic development of countermeasures for emergent ballistic missile threats as a prime priority in FY 2016. AT&L will employ JWP funds to partner with the Joint Staff on a series of air warfare scenarios employing engineering-level detail to accurately depict performance of US systems versus potential adversary in the most stressing of operational environments. Continued support of JIFX, now spotlighted as a prime DoD incubator for innovation, will continue to provide joint customers with insights supporting ambitious but realistic definition of requirements for new warfighting capabilities. Funding will be dedicated to renewing US European Commands to assess capability gaps resulting from a resurgent Russian military posture. Support for the TIDES projects conducted by the National War College will provides US Pacific Command with a planning framework for humanitarian/civil assistance supporting new international partnerships on the Pacific Rim. Funding support for Joint Staff capability examinations and for the analytic efforts of an “Acquisition-Intelligence-Requirements Task Force” synchronizing efforts on Intelligence Mission Data production will round out the major investments for the Joint Warfighting Program. As in FY 2015, this is an ambitious plan to leverage a relatively modest resource. ***FY 2017 Plans:*** This segment will provide independent analysis of joint issues and capability gaps. It will provide responsive and timely capability development pathways and recommendations for rapid acquisition, field experiments conducted by joint military staffs and units. It will provide an independent source for enabling capability development suitable for joint experimentation undertaken by joint authorities.			
Accomplishments/Planned Programs Subtotals	10.108	4.982	7.848

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance is measured through metrics including (1) objective validation of enhanced CCMD capabilities to perform joint missions in their assigned theaters and areas of responsibility, (2) documented delivery effective joint operational concepts, (3) confirmed production of refined and validated capability descriptions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603781D8Z / *Software Engineering Institute (SEI)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	15.198	15.173	14.264	-	14.264	15.441	15.909	16.130	16.447	Continuing	Continuing
P781: *Software Engineering Institute (SEI)*	-	15.198	15.173	14.264	-	14.264	15.441	15.909	16.130	16.447	Continuing	Continuing

A. Mission Description and Budget Item Justification

Software is a key to meeting the Department of Defense's (DoD's) increasing demand for high-quality, affordable, and timely national defense systems. Systemic software issues are significant contributors to poor program execution. Reliance on software-intensive mobile and net based products and systems has increased (e.g., Joint Tactical Radio System, USS ZUMWALT (DDG-1000), Joint Strike Fighter, F-22, and Army Modernization). As stated in the 2010 National Research Council of the National Academy of Sciences report entitled Critical Code, "It is dangerous to conclude that we are reaching a plateau in capability and technology for software producibility." The report notes that software is "…unconstrained by traditional physical engineering limitations…," and what we can accomplish is derived "…from [the] human intellectual capacity to conceptualize and understand systems…." With growing global parity in software engineering, the DoD must maintain leadership to avoid strategic surprise. The Software Engineering Institute (SEI) Program Element (PE) addresses the critical need to research, develop, and rapidly transition state-of-the-art software technology, tools, development environments, and best practices to improve the engineering, management, fielding, evolution, acquisition, and sustainment of software-intensive DoD systems. The SEI's program of work coordinates across the DoD through Reliance 21, the overarching framework of the DoD's Science and Technology (S&T) joint planning and coordination process. This PE benefits every Community of Interest (COI) to some degree due to the ubiquitous nature of software, but directly benefits: Command, Control, Communications, Computers, and Intelligence (C4I); Autonomy; Cyber; and Engineered Resilient Systems. This PE also leverages expertise in government, industry, and academia to enable the development of joint-Service capabilities.

Software is more pervasive than ever, and computer programs are growing in size and complexity. Designing, managing, and securing integrated, complex, and large-scale mission-critical systems are abilities that the DoD and the Defense Industrial Base (DIB) have not yet mastered. To address this, the PE funds research and development within the SEI Federally Funded Research and Development Center (FFRDC) and, to access particular expertise, in the Services, industry, and academia.

The SEI FFRDC is the DoD's dedicated source for software research and development. It is an institute which enables the exploitation of emerging software technology by bringing engineering, management, and security discipline to software acquisition, development, and evolution. The SEI FFRDC focuses on software technology areas judged to be of the highest payoff in meeting defense needs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603781D8Z *I Software Engineering Institute (SEI)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	15.754	15.202	15.181	-	15.181
Current President's Budget	15.198	15.173	14.264	-	14.264
Total Adjustments	-0.556	-0.029	-0.917	-	-0.917
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.510	-			
• Realignment for Higher Priority Programs	-	-	-0.807	-	-0.807
• FY15 Reprog. for Cancelled Account	-0.006	-	-	-	-
• Other Reprogrammings	-0.040	-	-	-	-
• FFRDC Reduction	-	-0.029	-	-	-
• Economic Assumptions	-	-	-0.110	-	-0.110

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603781D8Z / *Software Engineering Institute (SEI)*	Project (Number/Name) P781 / *Software Engineering Institute (SEI)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P781: *Software Engineering Institute (SEI)*	-	15.198	15.173	14.264	-	14.264	15.441	15.909	16.130	16.447	Continuing	Continuing

A. Mission Description and Budget Item Justification

The SEI FFRDC was established in 1984 as an integral part of the DoD's initiative to identify, evaluate, and transition software engineering technologies and practices. The SEI maintains unique software research and program support capabilities in a space where the DIB and academia cannot as readily address challenges. The mission of the SEI is to provide the DoD with technical leadership and innovation through research and development to advance the practice of software engineering and technology. The SEI works across Government, industry, and academia to improve the state of software engineering from the technical, acquisition, and management perspectives. The SEI engages in research and development of critical software technologies and tools, and collaborates with the larger software engineering research community. It facilitates rapid transition of software engineering technologies into practice, and evaluates emerging software engineering technologies to determine their potential for improving software-intensive DoD systems. Since its inception, the SEI has helped to transform the fields of software engineering and acquisition, network security, real-time systems, software architectures, and software-engineering process management.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Software Engineering Institute (SEI) Research	15.198	15.173	14.264

Description: SEI research projects are awarded on a competitive basis across the SEI. The number of projects and funding levels will vary from year to year based on the size and scope of proposed projects. Research projects cross-cut the FFRDC's experience base in order to advance existing SEI initiatives. SEI research focuses on the most significant and pervasive software and cybersecurity challenges within the DoD, such as improving the scalability and reliability of software assurance, software/ hardware supply chain risk management, validation and trust in autonomous systems, human-computer and human-technology interaction including insider threats, computing and communication at the tactical edge, and quantitative methods to improve the efficiency and performance of acquisition strategies.

FY 2015 Accomplishments:

- Applied new formal verification algorithms and automated analysis techniques to verify the design and performance of complex, mission critical, cyber-physical, distributed-adaptive, real-time systems.
- Demonstrated and applied techniques for quantifying the efficacy of individual cyber operators in realistic cyber operations exercises, measuring the tactical and strategic capabilities of cyber mission forces.
- Integrated and configured existing DoD tools and systems to detect behaviors utilized by malicious insiders; validated the efficacy of fielded insider threat capabilities for DoD organizations.
- Produced, demonstrated, and delivered tools to trace information flow through and between mobile apps to discover unintended disclosure of sensitive information.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603781D8Z / *Software Engineering Institute (SEI)*	**Project (Number/Name)** P781 / *Software Engineering Institute (SEI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Developed and tested the feasibility of accelerated automated vulnerability discovery tools to assist in the discovery of exploitable software faults to reduce system exposure. • Accelerated adoption and demonstrated effective use of Agile methods by DoD software development and acquisition program offices through ongoing leadership of the Agile Collaboration Group, which is composed of DoD and DIB representatives. • Merged verification, testing, and assurance case information to implement a prototype notation allowing these concepts to be applied throughout the program lifecycle to demonstrate technical feasibility and build assurance evidence.			
FY 2016 Plans: • Review the technical thrust for high performance software components for processing, dissemination, and exploitation compared to ongoing efforts in the DoD to ensure that this technology area fills needed technology gaps. • Work with ASDR&E Research Directorate and relevant service representatives to define a sustainable long-term research plan so that investments anticipate information technology challenges for the DoD in the mid and long-term future. • Develop and demonstrate tools and techniques for cloud-computing-like processing and data access in disconnected, intermittent, and low-bandwidth tactical edge environments. • Apply human language synthesis techniques and demonstrate technical feasibility of the automatic generation of human comprehensible explanations of unexpected robot actions to help build trust in autonomous systems used in close proximity with humans. • Extend tools and expand techniques for model-based engineering of software-reliant systems and the generation of assurance evidence. These tools will support automatic generation of secure code, automated code vulnerability discovery, and synthesis of assurance cases. • Enhance and deploy scalable and validated methods and software support for the training and development of the cyber mission workforce. • Test alternative data selection and visualization techniques in simulated environments to determine causes of anomalies and outliers in data analysis. • Develop and apply techniques for rapidly prototyping tactical decision support systems that extract information from data, establish confidence in the information, and reliably deliver it in near real-time.			
FY 2017 Plans: • Create tools and techniques for automated assurance of security policy enforcement in mission and safety critical systems; collect and analyze defect data to identify potential security issues early, and achieve cost reductions. • Develop tools and techniques for early stage application of statistical model checking to validate the reliability and robustness of safety critical systems. • Create and implement an architecture and platform for adaptive Software Defined Electronic Warfare (EW) and Electronic Protection, where EW functionality is implemented in software rather than hardware.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603781D8Z / *Software Engineering Institute (SEI)*	**Project (Number/Name)** P781 / *Software Engineering Institute (SEI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Develop tools and techniques to adapt, develop, and operationalize principles of robust decision making to support DoD strategic decision making processes in cases where uncertainty is deep, information is imperfect, dozens of variables interact in nonlinear ways, and human choice and behavior generate unpredictable patterns. • Develop and demonstrate principles, tools, and techniques for characterizing, measuring, and ensuring quality of data across multiple heterogeneous data sets; apply these techniques to imagery data from multiple international commercial and government sources.			
Accomplishments/Planned Programs Subtotals	15.198	15.173	14.264

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• BA 2, PE # 0602751D8Z, P278: *Software Engineering Institute Applied Research*	8.844	8.807	8.420	-	8.420	9.343	10.120	10.260	10.462	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

• Transition of tools and practices for use in DoD programs of record to the Defense Industrial Base, and to a number of agencies and organizations sponsoring work.
• Number of publications in refereed journals and peer reviewed reports.
• Number of external research collaborations and interactions with the broader software engineering research community.
• Adoption of coding standards and process techniques by standards bodies, working groups, and software/systems engineering organizations.
• Number of training courses and curricula developed to contribute to the growth of capability in the software engineering research and development community, and software/system acquisition workforce.
• Development of new scalable technical and software-enabled cyber security approaches that address software assurance and improve enterprise resiliency.
• Reduced number of mission-critical software-reliant acquisition program failures, cost and schedule overruns, as well as quantitative improvements in overall system cost, time to develop, and performance. This will be evidenced by: reductions in time to test software and the amount of rework required; improved ability to articulate software requirements; development of techniques that offer orders of magnitude improvement in software productivity; development of new software algorithms and abstractions; and decreased number of software defects found through application of effective process and software development methods.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	202.483	55.821	70.320	74.943	-	74.943	69.442	73.132	80.891	85.057	Continuing	Continuing
P826: *Quick Reaction Fund*	62.820	17.863	22.212	23.675	-	23.675	21.828	23.045	25.618	26.993	Continuing	Continuing
P828: *Rapid Reaction Fund*	130.629	34.225	44.426	47.350	-	47.350	43.657	46.090	51.236	53.986	Continuing	Continuing
P831: *Joint Rapid Acquisition Cell Support*	4.859	1.554	1.620	1.636	-	1.636	1.652	1.669	1.686	1.703	Continuing	Continuing
P833: *Strategic Multi-Layered Assessment (SMA) Support*	4.175	2.179	2.062	2.282	-	2.282	2.305	2.328	2.351	2.375	Continuing	Continuing

Note

The Quick Reaction Special Projects (QRSP) Program Element is focused on producing risk-reducing prototypes that anticipate adversaries' capabilities and address priority Combatant Command (COCOM) needs through short term, innovative science and engineering initiatives. QRSP efforts will support the Department's goal to provide a hedge against technical uncertainty by leveraging insights gained through mission-focused efforts and by fostering collaboration and innovation among government laboratories, academia, and commercial research.

A. Mission Description and Budget Item Justification

The QRSP Program Element develops risk-reducing prototypes and conducts demonstrations designed to develop capabilities in anticipation of emerging adversary threats and emerging capabilities, as well as address immediate COCOM needs. QRSP efforts support the Department's goal to provide a hedge against technical uncertainty by acting as an incubator for developing potentially game-changing capabilities and by fostering collaboration among other government agencies, DoD laboratories, academia, and the commercial sector. QRSP enables the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) to anticipate and respond to emergent DoD issues and time-sensitive threats by selecting projects within the year of execution. Project selection is guided by Department-level strategies and priorities, such as Better Buying Power 3.0, Reliance 21, the Long Range Research and Development Program Plan, and COCOM Integrated Priority Lists (IPLs). QRSP efforts field new capabilities at low cost in short time-frames, inform the requirements process, and inject innovative technologies into programs of record. The QRSP Program supports four major project codes that expedite development and transition of new capabilities to the warfighter. These projects are: 1) Quick Reaction Fund (QRF); 2) Rapid Reaction Fund (RRF); 3) Joint Rapid Acquisition Cell (JRAC) support; and 4) Strategic Multi-Layered Assessment (SMA) support. Focus areas align to DoD science and technology priorities, including counter anti-access/area denial; counter weapons of mass destruction; low-cost precision engagement; counter-electronic warfare; and autonomous systems.

The QRF Program objectives are to develop prototypes in response to emergent conventional warfare needs that take advantage of breakthroughs in rapidly evolving technologies. The QRF is executed by the Rapid Reaction Technology Office (RRTO). QRF projects focus on force protection to enhance anti-access and area denial capabilities, space capability resilience, and broad electronic warfare capabilities. The QRF initiates projects during the execution year and focuses on maturing technologies critically needed for the COCOMs by producing prototypes for demonstration and evaluation. The QRF typically takes Technology Readiness Level (TRL)

four to five technologies and looks to transition them to an end user or COCOM at a TRL of seven or higher with a total project duration of 12 to 18 months. The QRF consistently exceeds the transition objective of 40 percent for demonstration programs (DoD Strategic Objective 3.5.2D).

The RRF Program objectives, executed by RRTO, are to develop proof of principle prototypes to counter emerging irregular warfare threats, anticipate adversaries' exploitation of new technologies and accelerate the delivery of effective and affordable capabilities to the warfighter. RRF initiatives support the DoD Research and Engineering Enterprise mission to develop, demonstrate, assess, and rapidly field innovative concepts and technologies that supply critical capabilities to meet time-sensitive operational needs. RRTO leverages technology developed outside of the DoD in the commercial sector, academia, international arenas, as well as small businesses and non-traditional sources, to address DoD needs as identified by COCOM, Military Service organizations, other Defense organizations, and interagency partners. Typical RRF programs are six to 18 months in duration and aim to mature a capability to demonstration. The RRF consistently exceeds the transition objective of 40 percent for demonstration programs (DoD Strategic Objective 3.5.2D).

The JRAC Program objectives focus on responding to Joint Urgent Operational Needs (JUONS) and Joint Emerging Operational Needs (JEONS) that have been submitted by COCOMs and validated by the Joint Staff. In addition, the JRAC's objectives are to manage the delivery of capabilities as requested by the COCOM in a time frame acceptable to the COCOM. Efforts, in most instances, utilize contingency and other rapid acquisition authorities.

The SMA cell's objective is to support all COCOMs, Joint Force Commanders, and other government agencies by assessing complex operational/technical challenges, which require collaborative multi-agency and multi-disciplinary approaches. With input from across the United States Government, academia, and the private sector, the SMA cell develops solution options to Joint Staff/COCOM-generated challenging problems and informs senior leadership. Each assessment is initiated at the request of COCOM senior leadership. Priorities for SMA cell programs are set by the Joint Staff Deputy for Operations. Products are typically generated within six months and directly contribute to the decision-making process of the Joint Staff/COCOM's senior leadership.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	59.235	90.500	76.441	-	76.441
Current President's Budget	55.821	70.320	74.943	-	74.943
Total Adjustments	-3.414	-20.180	-1.498	-	-1.498
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-20.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.791	-			
• Internal Realignment for Higher Priorities	-	-	-0.918	-	-0.918
• FY15 Reprog. for Cancelled Account	-0.023	-	-	-	-
• Other Reprogrammings	-1.600	-	-	-	-
• FFRDC Reduction	-	-0.180	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603826D8Z *I Quick Reactions Special Projects (QRSP)*

• Economic Assumptions	-	-	-0.580	-	-0.580

Change Summary Explanation

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense											Date: February 2016	
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*				Project (Number/Name) P826 / *Quick Reaction Fund*			
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
P826: *Quick Reaction Fund*	62.820	17.863	22.212	23.675	-	23.675	21.828	23.045	25.618	26.993	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Quick Reaction Special Projects (QSRP) Program supports four separate projects that provide rapid funding to expedite development and transition of new prototypical technologies to the warfighter. The QSRP Program provides the flexibility to mitigate emerging threats and addresses needs that arise outside the two-year budget cycle.

The Quick Reaction Fund (QRF) Program provides the Services, components, Combatant Commands (COCOMs), and force providers opportunities to capitalize on technologies that are at a relatively high level of technical maturity and to rapidly develop and field-test promising new proof-of-principle prototypes that can have immediate impact on military operations. QRF initiatives typically deliver a prototype application within 12 months of being funded.

The QRF Program focuses on projects that have the potential to address conventional, disruptive, catastrophic and irregular threats. More specifically, initiatives that serve to maintain a technical advantage over potential adversaries and reduce technical risk barriers in the following interest areas: counter anti-access and area denial capabilities; base protection; electromagnetic bandwidth and spectrum enhancement; persistent intelligence, surveillance, and reconnaissance; newly emerging national threats; directed energy capabilities; low-cost precision engagement capabilities; unmanned and robotic systems; counter weapons of mass destruction capabilities; and, counter-electronic warfare technologies.

In FY 2016 and FY 2017, the QRF Program will continue to identify and fund new projects and prototypes that respond to critical operational needs and emerging threats. Current and future efforts that show significant effectiveness can be leveraged by additional investments in order to accelerate transition to operational forces.

Success stories and significant transitions of note for FY 2015 include:
•Morning Express: This project to develop countermeasures to electronic systems to protect forces and infrastructure from attack transitioned to the joint Air-Sea Battle office following demonstrations of the prototype systems and execution of power studies, technical analyses, thermal assessments and antenna isolation analysis.
•Square Dance Collaboration on Sentient-R: This project created a single integrated Maritime Domain Awareness (MDA) environment to provide operational users from U.S. and Commonwealth nations access to MDA sensitive compartmented information (SCI) data. Sentient-R established web-based access to the leading Intelligence, Surveillance and Reconnaissance (ISR) Research & Development (R&D) system. Through data sharing, partners are able to rapidly collaborate, develop, share, and test new ISR capabilities across operational environments. Training, operating manuals, and accreditation on the network were also provided.
•U.S. and Australian Enclave Moving Target Cyber Collaboration Experiment: Aimed at developing a network protect and defend capability demonstrating enclave resiliency during cyber events, this project demonstrated a shadow network for covert information sharing between U.S. and Australian Defense Department cyber operations. The ability to detect suspicious/malicious activity allowed analysts to assess activity without adversary awareness while operating through a cyber event was demonstrated via an experiment on unclassified networks. This capability transitioned to the U.S. Navy (USN) Automated Digital Network System (ADNS) Program Office.

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•Pacific Pilot: The Pacific Pilot project integrated network technologies and demonstrated a net-centric approach to bi-directional dissemination of command, control, communications, computers, intelligence, surveillance and reconnaissance data to find, track and fix threats supporting U.S. Air Force, U.S. Navy and U. S. Special Operations Forces' tactical communications. The capability was transitioned to U.S. Navy and U. S. Air Force program offices.
•Global Positioning System (GPS) Urban Environment Analysis Tool: This project developed and validated a tool to analyze different ways to augment GPS in a dense urban environment, which can be used to inform investment decisions and ultimately warfighter use of various GPS augmentations. Following a test of the tool against test data from New York City, the project was transitioned to the U.S Army Product Director for Positioning, Navigation and Timing.
•Project 77: This project developed a target surrogate, conducted a data collection, and provided analyses to establish the feasibility of a new synthetic aperture radar mode. The metric is intended for automatic detection without operator-in-the-loop to support wide area surveillance. The Project 77 products were inserted into a classified program.
•Project White: Project White assessed the viability of laser technology as a possible countermeasure to enemy sensors and Intelligence, Surveillance and Reconnaissance (ISR) systems. Effects testing was executed at the Naval Research Laboratory (NRL). Project White transitioned into the Navy Solid State Laser Technology Maturation (SSL-TM) program.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Dark Storm	1.700	1.800	-
Description: The program provides advanced Space Situational Awareness (SSA) collection capabilities. Upon completion in FY 2016, Dark Storm will successfully address important knowledge gaps to further protect U.S. interests in space. Details are classified. ***FY 2015 Accomplishments:*** Dark Storm developed and implemented a multi-camera system for SSA, implemented algorithm enhancements and provided site software updates to equipment. The project conducted data analysis of maneuver data history, space observations and tracks from information collected at three sites. ***FY 2016 Plans:*** Dark Storm hardware will deploy to six test sites to prove viable data transfer processes to transmit data to a central site. The central site will have software installed to enable processing and integration of the data. The field equipment will also be hardened against weather and tampering.			
Title: Hardware/Software (HW/SW) Assurance and Integrity Analysis	3.000	4.000	4.000
Description: The Department of Defense (DoD) has developed a trusted systems strategy that is based upon mission assurance, comprehensive protection planning, industry standards and advancing DoD's capability to identify and mitigate HW/SW vulnerabilities through techniques and tools. This project supports research and development focus to advance capabilities that can be made available to current and future programs in acquisition, operational systems and infrastructure.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
These HW/SW Assurance projects directly support the 2014 National Defense Authorization Act (NDAA) Section 937. It provides funding for the Department's capabilities to augment and federate existing HW/SW assurance expertise, capabilities and facilities within the Services and Agencies, to address existing gaps, as well as emerging threats and vulnerabilities. The resulting federation will detect, assess and prioritize critical mission vulnerabilities to malicious software attacks and supply chain exploitation vulnerabilities, promulgate findings and mitigate critical vulnerabilities in both HW/SW. ***FY 2015 Accomplishments:*** In FY 2015, this effort continued development, assessment and promulgation of software test tools and techniques. The program continued maturation of a federated approach to ensuring HW/SW tools, techniques, expertise and support to acquisition and sustainment programs. The effort continued gap identification, assessment and prioritization, and maturation of cross-DoD concept of operations (CONOPS) in delivery of HW/SW assurance services to programs. The program initiated planning, fact-finding and cross-service coordination for software and hardware assurance enterprise license needs. ***FY 2016 Plans:*** This program will continue development, assessment, recommendation and promulgation of software test tools and techniques to programs. It will continue maturation of a federated approach to ensuring HW/SW tools, techniques, expertise and support to acquisition and sustainment programs, and continue HW/SW capability identification, gap identification, assessment, prioritization and remediation. The program will begin SW assurance tool license acquisition and transition to centralized inventory and operational management. ***FY 2017 Plans:*** This program will continue development, assessment, recommendation and promulgation of software test tools and techniques to programs. It will continue maturation of a federated approach to ensuring HW/SW tools, techniques, expertise and support to acquisition and sustainment programs, and continue HW/SW capability identification, gap identification, assessment, prioritization and remediation. The program will continue SW assurance tool license acquisition, and using centralized inventory and operational management, promulgate licenses and tools to programs.			
Title: Columbia ***Description:*** Columbia is an electronic countermeasure system designed to address a specific threat to U.S. Forces. The Columbia effort will deliver a size, weight and power (SWaP) assessment and laboratory electromagnetic interference/ electromagnetic compatibility (EMI/EMC) analysis of a sustainable, maintainable, self-contained capability that will mitigate the effects of an attack. Details of this project are classified. ***FY 2015 Accomplishments:***	3.000	-	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Columbia successfully conducted an analysis of alternatives and SWaP assessment. EMI/EMC laboratory testing was conducted and system Concept of Operations (CONOPS) was defined. Potential transition to U.S. Pacific Command (USPACOM) for deployment has been pursued.			
Title: Project 319TR ***Description:*** Utilizing existing assets, Project 319TR provided an initial 120-day, 24-hour/seven-days-a-week operations collection utilizing a unique sensor system. Further details are classified. ***FY 2015 Accomplishments:*** A successful demonstration in FY 2015 provided the Services an alternate source of information for transition to multiple classified directorates/organizations. Further details are classified.	3.560	-	-
Title: Project 904 Phase II ***Description:*** Project 904 Phase II demonstrated an end-to-end collection system to address ongoing information needs. Details of the project are classified. ***FY 2015 Accomplishments:*** Project 904 Phase II demonstrated the ability to provide the warfighter an alternative avenue to information that may not typically be accessible due to higher priority tasking requirements. This allows the warfighter to gain timely access to required critical information during planning and operational phases. This technology transitioned to the Services after successful development.	0.753	-	-
Title: Airborne General Purpose Seeker Emulator Testbed ***Description:*** This project will develop a modular, reconfigurable airborne test bed designed to emulate the seekers of emerging threat missile systems. Details of the project are classified. ***FY 2015 Accomplishments:*** A trade-off analysis for the emulator architecture and an aircraft assessment was conducted. Final emulator and antenna system designs and documentation were completed. Emulator performance was characterized following aircraft flight certification. The general purpose missile seeker test bed was developed in conjunction with the Test Resource Management Center. U.S. Pacific Command, U.S. Central Command and U.S. European Command have pursued data regarding the testing and utility of the system. ***FY 2016 Plans:***	3.000	3.000	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The next phase of this effort will include integration of the pods onto the aircraft, completion of aircraft flight certification, performance of a flight test and data collection to prove the capability. This capability will support the U.S. Navy, U.S. Air Force, U.S. Army and the Missile Defense Agency.			
Title: Robust Tactical Data Link Modernization ***Description:*** This project developed new Link 16 improvements for increased anti-jam communication performance including a new antenna array and the development of adaptive array processing algorithms, and a prototype hardware implementation of a more robust waveform mode. ***FY 2015 Accomplishments:*** This project rapidly prototyped an airborne array data collection system for a 2015 field exercise. Both the prototype hardware implementation of the new waveform mode and the adaptive array processing algorithms were tested against data collected from the exercise to demonstrate the real-world performance gains offered by Robust Tactical Data Link Modernization's Link 16 enhancements. This testing supported a transition of the capability to the U.S. Air Force.	2.850	-	-
Title: Anti-Access/Area Denial Focus Area ***Description:*** In FY 2016 and FY 2017, this Quick Reaction Fund (QRF) focus area will support projects that concentrate on developing capabilities and countermeasures in anticipation of emerging needs to monitor and/or gain access to geographical areas that have been strategically denied by adversarial forces and technologies. The Rapid Reaction Technology Office (RRTO) will ensure the QRF efforts are not duplicative with other work within the Defense Department or with outside agencies and will seek to leverage such efforts. ***FY 2016 Plans:*** Anti-access/area denial investment decisions during the budget year will respond to Department, Combatant Command (COCOM), Service and other government organization priorities. New investments will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the Department of Defense (DoD), Federally Funded Research and Development Centers (FFRDCs), other government agencies, industry and academia will help identify areas critical to developing future anti-access/area denial technological enhancement efforts. Anticipate funding two to three prototypes in FY 2016. ***FY 2017 Plans:*** Anti-access/area denial investment decisions during the budget year will respond to Department, COCOM, Service and other government organization priorities. New investments will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry	-	3.059	4.907

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and academia will help identify areas critical to developing future anti-access/area denial technological enhancement efforts. Anticipate funding three to four prototypes in FY 2017.			
Title: Counter-Electronic Warfare Technologies Focus Area ***Description:*** This focus area, in anticipation of emerging needs, will include the maturation of proof of principle prototypes that advance countermeasures against electronic components and systems to protect forces and infrastructure. In addition, projects may include techniques and methodologies that reduce adversarial electronic attack capabilities and enhance our ability to operate in denied areas. The RRTO will ensure the QRF efforts are not duplicative with other counter-electronic warfare efforts and will seek to leverage other such efforts. ***FY 2016 Plans:*** Investment decisions in counter-electronic warfare technologies during the budget year will respond to Department, COCOM, Service and other government organizations priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry and academia will help identify areas critical to counter-electronic warfare efforts. Anticipate funding three to four projects in FY 2016 ***FY 2017 Plans:*** Investment decisions in counter-electronic warfare technologies during the budget year will respond to Department, COCOM, Service and other government organizations priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry and academia will help identify areas critical to counter-electronic warfare efforts. Anticipate funding four to five projects in FY 2017.	-	5.032	6.447
Title: Counter-Weapons of Mass Destruction (CWMD) Focus Area ***Description:*** This focus area for FY 2016 and FY 2017, in anticipation of emerging needs, will include the development and advancement of prototype technologies that focus on the detection and interdiction of chemical, biological, radiological, nuclear, and high yield explosives threats. Projects may include techniques and methodologies that improve detection sensitivities; persistent intelligence, surveillance and reconnaissance; data-to-decision tools; and, global situational awareness. The Rapid Reaction Technology Office (RRTO) will ensure the Quick Reaction Fund (QRF) efforts are not duplicative with other CWMD efforts and will seek to leverage other such efforts. ***FY 2016 Plans:*** Investment decisions in CWMD during the budget year will respond to Department, COCOM, Service and other government organization priorities and new projects will be considered as new threats emerge or new opportunities are presented. Research	-	2.562	4.107

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry and academia will help identify areas critical to CWMD efforts. Anticipate funding two to three projects. ***FY 2017 Plans:*** Investment decisions in CWMD during the budget year will respond to Department, COCOM, Service and other government organization priorities and new projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry and academia will help identify areas critical to CWMD efforts. Anticipate funding three to four projects.			
Title: Persistent Intelligence, Surveillance and Reconnaissance (ISR) Focus Area ***Description:*** In anticipation of emerging needs, this focus area for FY 2016 and FY 2017 will include capabilities that improve ground, air, sea and space situational awareness for decision makers. Technologies may explore new or improved methods for surveillance sensors to operate within denied areas and more effective ISR architectures for rapidly processing, exploiting and disseminating situational awareness intelligence. They will ensure the efforts are not duplicative with on-going persistent ISR work and will seek to leverage other such efforts. ***FY 2016 Plans:*** Persistent ISR investment decisions during the budget year will respond to Department, COCOM, Service and other government organization priorities. Projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the government, industry and academia will help identify areas critical to developing future capabilities. Anticipate funding two to three projects. ***FY 2017 Plans:*** Persistent ISR investment decisions during the budget year will respond to Department, COCOM, Service and other government organization priorities. Projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the government, industry and academia will help identify areas critical to developing future capabilities. Anticipate funding three to four projects.	-	2.759	4.214
Accomplishments/Planned Programs Subtotals	17.863	22.212	23.675

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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E. Performance Metrics

In FY 2017, performance metrics applicable to the Quick Reaction Fund (QRF) include attainment of DoD Strategic Objective 3.5.2D. The title of this objective is "Maintain a Strong Technical Foundation Within the Department's Science and Technology (S&T) Program" and the metric for this objective is to transition 40 percent of completing demonstrations per year. Each QRF project typically has a period of performance of 12 months. All QRF projects are monitored for schedule deviation, transition outcome, and deliverables such as test reports, components and equipment. For projects that were completed in FY 2015, the QRF achieved a transition rate of approximately 80 percent.

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COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
P828: *Rapid Reaction Fund*	130.629	34.225	44.426	47.350	-	47.350	43.657	46.090	51.236	53.986	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Quick Reaction Special Projects (QSRP) Program supports four separate projects that provide rapid funding to expedite development and transition of new prototypical technologies to the warfighter. The QSRP Program provides the flexibility to mitigate emerging threats and addresses needs that arise outside the two-year budget cycle.

The Rapid Reaction Fund (RRF) is fully executed through the Rapid Reaction Technology Office (RRTO). RRTO was established to accelerate the development and transition of high-potential science and technology (S&T) projects into operationally useful prototypes in the execution years. The RRTO leverages the Department of Defense (DoD) S&T base and those of the other federal departments, academia and industry; stimulates interagency coordination and cooperation; accelerates the fielding of prototypical capabilities and concepts to counter anticipated and emerging threats; and, provides feedback to the S&T community to guide long term developmental strategies. Projects support high level Department strategies and objectives, such as Better Buying Power 3.0 and the Defense Innovation Initiative and geographic Combatant Command (COCOM) priorities. RRTO anticipates adversaries' exploitation of technology, including available and emerging commercial capabilities. Prototypes delivered by RRTO demonstrate the feasibility of a new technology, enable integration into larger systems and provide cost effective capabilities to operational users faster than the typical acquisition cycle.

In prior years, RRTO has explored novel methods and new approaches for persistent surveillance for counter-insurgency; developed alternate power sources for sensors and systems; provided low-cost capabilities for small-footprint operations; expanded human, social, and cultural knowledge; increased small unit situational awareness; advanced the interface between law enforcement and military operations; developed advanced biometrics and forensics capabilities; supported denied area operations; performed strategic multi-layer assessments; and, established an innovation outreach cell that facilitates better interactions with small companies developing emerging technologies that do not normally do business with the DoD.

In FY 2017, RRTO will continue to explore new and emerging capabilities to support irregular warfare operations in support of the Under Secretary of Defense (Acquisition, Technology & Logistics), the Assistant Secretary of Defense (Research and Engineering) and the Deputy Assistant Secretary of Defense (Emerging Capability & Prototyping) goals. With project selection occurring during the execution year, the RRTO's focus areas for FY 2016 projects include: capabilities to operate in denied areas; navigation in global positioning system-denied environments; persistent Intelligence, Surveillance and Reconnaissance (ISR) architectures; ISR sensors; global warming’s impact on operations in the Arctic; novel power sources for unmanned vehicles; emerging undersea warfare technologies; adaptive manufacturing to rapidly field prototypes; interface of law enforcement and military operations; biometrics and forensics science and technology; autonomous operations; data processing, exploitation and dissemination; exploitation of new and emerging cell phone technologies; counter-proliferation initiatives; wargaming and red teaming of emerging threats and capabilities; strategic communications and multi-layer assessments; and, non-traditional approaches to leverage innovative businesses.

The typical length of an RRTO project falls within a six to 18 month range in order to more effectively respond to the Warfighter.

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Success stories and significant transitions of note for FY 2015 include:

•Calderaevent: Calderaevent successfully demonstrated the ability to have situational awareness in denied environments. Technologies leveraged by this effort include precise timing equipment, military-grade radio sets and government developed algorithms. The capability was successfully demonstrated with accuracy of 10 meters at Trident Spectre 2015 at Joint Expeditionary Base Little Creek-Fort Story, Virginia. In early 2016, the Calderaevent capability will be demonstrated in the U.S. Pacific Command (USPACOM) area of responsibility with nodes in Hawaii, Japan, Australia and aboard an underway Navy ship in support of a transition decision to a program of record.

•Green Flash: Completed and transitioned the Green Flash prototype providing an overhead threat event countdown and notification application for smart phones. Details of this project are classified.

•Operationalizing "Just Doesn't Look Right": Completed the demonstration of a capability to give peacekeepers and military police enhanced situational awareness and a better understanding of culturally relevant suspicious behaviors, potentially reducing the learning curve for new missions and facilitating personnel safety and mission completion. Project deliverables transitioned to U.S. Southern Command, the Uruguay military, and elements of the United Nations.

•Flume: Completed phase one of the Flume assured data delivery software project which provided assured delivery of data over existing networks used by U.S. Special Operations Command (USSOCOM). This phase consisted of technical discovery, testing and documentation.

•Forward Firing Flare: Completed the Forward Firing Flare project which delivered two ALE-47 chaff/flare launchers in the forward firing configuration for incorporation aboard nonstandard aircraft. The products transitioned to assets deployed in support of U.S. Central Command (USCENTCOM).

•Intelligent Materials Sensor System (IMSS): The IMSS prototype uses a unique phosphorescent nano material to provide target information when illuminated. Following a demonstration of this optically-transparent tagging mechanism from a military aircraft LITENING Targeting Pod, IMSS received contracts in FY 2015 from USSOCOM and the U.S. Army.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Low Cost Innovative Projects (Projects Less Than One Million Dollars Each)	24.625	-	-
Description: Selected, executed and transitioned multiple low cost projects in the areas of: unmanned autonomous vehicles; electromagnetic spectrum agility; space resiliency; detection of explosives and weapons of mass destruction; deterrence of violent extremism; exploitation of commercial off-the-shelf technology; exploitation of communications technologies; small footprint operations; and, other emerging technology areas. These projects delivered proof of principle prototypes for evaluation or assessment by warfighters and interagency users.			
FY 2015 Accomplishments: •Gossip Enhancements to Social Network Aided Geo-Location (SNAG): Completed a classified project to apply geo-enhancement methods to Open Source Intelligence (OSINT) data sets to achieve greater location-based exploitation. Project deliverables have transitioned to Defense Intelligence Agency's (DIA) all-source analytic environment for intelligence production. The performers continue the enhancement efforts down to the neighborhood level. •Covert Unmanned Underwater Vehicle (UUV) Optical Communications Demonstration: Completed a Covert Unmanned Underwater Vehicle Optical Communications Demonstration which developed an optical modem to efficiently exfiltrate mission			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
data without requiring physical recovery of the UUV. Project deliverables transitioned to U.S. Navy's Commander, Submarine Forces. •Lightweight Intelligent Thermoelectric Energy: Completed the Lightweight Intelligent Thermoelectric Energy prototype, a man-portable electrical power source that can convert combustion heat, of any heat source, into useful electric power. All deliverables were met and the group is pursuing transitions to the U.S. Army Special Operations Command, the U.S. Southern Command, and the United Nations Peacekeeping Operations (PKO) mission. •Supercavitating Vehicle Hybrid Rocket Motor Technology: Completed the Supercavitating Vehicle Hybrid Rocket Motor Technology project to demonstrate the potential of inexpensive, reliable, off-the-shelf solid rocket motors to augment the controllability and superior performance of liquid rocket motor configurations. This was an anticipatory effort to enhance the payloads for the Office of Naval Research's Large Displacement Unmanned Underwater Vehicle. •Collapsible Water Charge: Completed user evaluation of the Collapsible Water Charge prototype to gather critical operational user input and feedback on tactics, techniques, and procedures for the shaped charge concept developed by the U.S. Naval Explosive Ordnance Disposal (EOD) Technology Division. Through employment of adaptive manufacturing techniques, the project produced multiple prototype configurations for evaluation prior to selection of an optimal form factor. The capability transitioned to Joint EOD operators. •Topaz: Completed the Topaz project, a prototype radio frequency intrusion detection sensor in support of critical infrastructure protection efforts. Details of this project are classified. •Periscope Simulator Demonstration: Completed the Periscope Simulator Demonstration for Naval Underwater Warfare Center to evaluate the effectiveness of a prototype non-acoustic periscope simulator payload. Project deliverables transitioned to U.S. Navy's Commander, Submarine Forces. •Fuel Management and Tailoring Device: Completed demonstration of the Fuel Management and Tailoring Device which monitors, tailors and overcomes fuel inefficient driving habits in tactical vehicles. The low cost (less than $500) fuel management device reduces fuel requirements by three to nine percent. Project deliverables were transitioned to the U.S. Navy Expeditionary Combat Command, U.S. Marine Corps, and the Army's Heavy Expanded Mobility Tactical Truck.. •Contingency Communications: Completed Contingency Communications to develop low visibility mission communications capabilities to protect clandestine operators and information. Project deliverables transitioned to U.S. Special Operations Command.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
•Quantum Sensing: Completed the Quantum Sensing project to explore methods to increase imagery resolution by exploiting quantum mechanical phenomena. Details of this project are classified.			
•Opal: Completed and transitioned the Opal low power, small form factor software defined radio prototype to support Department of Defense and Department of Homeland Security missions. Details of this project are classified.			
•Distributed Full Motion Video (FMV) Exploitation prototype: Completed the Distributed FMV Exploitation project, which developed a prototype software system to enable FMV exploitation in near real time. Project deliverables transitioned to the National Geospatial-Intelligence Agency and are hosted on its server.			
•Controlling Cooperative Unmanned Aerial Vehicles (UAV) Using Brainwaves: Completed the Controlling Cooperative UAVs Using Brainwaves project to develop and demonstrate core technologies to enable a warfighter to conduct simple military missions using UAVs controlled by brainwaves. The results of this project will inform future developmental efforts.			
•Counter Smuggling Weapons of Mass Destruction (WMD) Analysis, Training, and Technology (C-SWATT): Completed the C-SWATT effort to provide national security forces in friendly/allied nations with the capability to detect and interdict chemical, biological, radiological and nuclear (CBRN) materials and other illicit traffic. Project deliverables transitioned to the Counter-Terrorism Technical Support Office and Defense Threat Reduction Agency.			
•Distributed Precision Geo-location System: Completed the Distributed Precision Geo-location System demonstration, which leveraged a large number of existing fielded sensors to rapidly provide a robust capability to detect, identify and track targets of interest. Details of this project are classified.			
•Fourth Option: Completed the Fourth Option project to conduct modeling and simulation for a novel capability to track and trail threat vessels. The results of this effort are informing decisions for further development of the novel tracking capability. Details of this project are classified.			
•Operate to Know: Completed the Operate to Know project demonstrating a layered sensing and real-time situational awareness technology for the U.S. Marine Corps. This effort brought the prototype architecture to a live wargaming environment to evaluate the concept. Follow-on experimentation will be supported by the U.S. Marine Corps to enhance the capability and develop a sustained operational capability.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
•Net Zero Engagement: The Net Zero Engagement project compiled proven engagement approaches and coordinated participation and planned efforts with the DoD, warfighters, and host nation partners. The project developed frameworks, tools and training for U.S. Service personnel to build partner capacity and achieve better engagement outcomes in unstable and transitioning states at significantly lower cost. •ACME+: Completed the ACME+ project to adapt sensor technology to exploit the emerging third and fourth generation cellular telephone High Speed Packet Access (HSPA) and High Speed Packet Access Evolved (HSPA+) communication protocols. This effort will allow the warfighter to address emerging threats, such as terrorist activities. This capability transitioned to the end user in support of the warfighter. Details of this project are classified. •Arctic Cooperation: Completed the Arctic Cooperation project to assess the value added of Canadian commercial source data compared to data from classified U.S. sources for situational awareness in the Arctic. This effort allows a quantitative measure of current sensing, fusion and analysis capabilities. Details of this project are classified. •Lithium-ion Battery (LiB) State-of-Health Monitor: Completed the LiB State-of-Health Monitor project which created a diagnostic device for LiBs to detect irreversible chemical damage and prevent catastrophic failures. This capability will reduce the threat of sudden LiB failures, enabling safe use of efficient, energy-dense LiBs in a variety of platforms including unmanned systems. Prototype development was completed and plans are in development to transition the technology to U.S. Navy applications. •Laser Threat Detection and Defeat (LTDD): Completed the LTDD project which integrated advanced sensing technologies and mathematical algorithms into a prototype system capable of automatically identifying both the location and threat characteristics of offensively employed laser devices. The system enables Warfighters to effectively employ sensors and imagers to automatically detect, characterize and locate the laser threat so that it can be defeated. The technology transitioned to Technical Surveillance Counter Measures (TSCM) Operational Units for fielding and maintenance. •Perseus III: Completed the Perseus III project which enhanced the understanding of the capabilities and limitations of inexpensive, homemade unmanned aerial vehicles (UAVs) and how they may place Department of Defense (DoD) personnel, equipment and infrastructure at risk. Undergraduate college students participated in an exercise to identify low cost UAV solutions. The effort taps into nontraditional sources and provides DoD and the Intelligence Community with a fresh look at a growing problem. •Radio Frequency Interference: Completed the Radio Frequency Interference project which supported designing, executing and analyzing laboratory tests of radio frequency interference from a new class of low-power radio frequency devices on communications systems. The details of this project are classified.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
•Solid State Neutron Detector (SSND): Completed the SSND project which leveraged the single solid state detector previously developed by the National Aeronautics and Space Administration (NASA) and Department of Energy (DoE) to design, fabricate and test a two neutron detector package with associated electronics. This technology, which reduces material cost and false alarm rate while providing a 10-fold increase in detection sensitivity, has met all objectives for success. The team used the results of this project to inform future developmental efforts. •Visualization, Summarization, and Recommendation (VISR) for Audio/Visual Data: The VISR for Audio/Visual Data project created an integrated tool to incorporate basic data ingest tools into a framework capable of digesting and analyzing large amounts of data and making recommendations to the user for other sources on topic. With the successful completion of phase one, a second phase has been initiated to complete the project. •Anvil Plus: Adapted the cell phone exploitation technology from third generation to the emerging fourth generation Time Division Duplex-Long Term Evolution (TDD-LTE) communications protocols. Transitioned technology to the Defense Threat Reduction Agency (DTRA). The capability has been operationally deployed by a classified user. •Collaborative Coalition Structured Problem Solving: Completed the initial build of the Collaborative Coalition Structured Problem Solving that enabled collaboration between the United Kingdom's Defense Science and Technology Laboratory (DSTL) and the United States' Defense Threat Reduction Agency (DTRA). The capability offers a rigorous, flexible and operational solution for secure information sharing. Project software transitioned to DTRA and integration with DTRA's Advanced Analytics systems will continue in FY 2016. •Fusion Acquisition to Support Targeting (FAST): The FAST project developed a novel computational engine able to integrate light detection and ranging (LiDAR) and hyperspectral data in near real time. The technology is being assessed for potential transition to the Navy or National Geospatial-Intelligence Agency (NGA). •Future Infrared Search and Track (FIRST): The FIRST project demonstrated a novel sensor design that can detect targets with high resolution over a wide field of view (FOV) using an approach that multiplexes light from multiple portions of the area of interest onto a single focal plane array. The breadboard sensor design was successfully demonstrated. Development continues in FY 2016 leveraging prior year funds. •Text Recognition in Open Source Imagery: The Text Recognition in Open Source Imagery project developed computer vision algorithms for detecting and recognizing text in arbitrary uncooperatively-gathered pictures. The technology is being assessed for potential transition to the Air Force or National Geospatial-Intelligence Agency (NGA).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
•Technology Solutions for Manufacturing Advanced Products (TSMAP): The TSMAP project developed a program to protect strategically important industry sectors such as small and medium sized U.S. manufacturing firms. TSMAP developed techniques to expedite the secure deployment of new technology products for critical DoD applications. The project also produced an "Understanding Security" guidebook for distribution to government and commercial organizations. Identification of transition partners continues. •Undersea Critical Message Transfer: The Undersea Critical Message Transfer project delivered a method for underwater communication over long ranges with reliable transmission and reception. Details of this project are classified. The initial proof of concept was a success and enabled initiation of a follow on phase of work. The project continues in FY 2016 leveraging prior year funds. •Identity Operations for Open-source Intelligence (OSINT) Actors: Completed deliverables for Identity Operations for OSINT Actors, a project to develop software and techniques to help analysts deny adversary online anonymity and protect forces to characterize the identity, behaviors and affiliations of online actors in internet data sources. The project will transition to Counter-Improvised Explosive Device (IED) Operations/Intelligence Integration Center (COIC) and the U.S. Special Operations Command (USSOCOM). •Large Displacement Unmanned Undersea Vehicle (LDUUV) Common Control: Completed deliverables for LDUUV Common Control project, which is an initial integration of the Common Control System (CCS) control segment software with a representative LDUUV in order to inform and support the acquisition activities of the Naval Sea Systems Command (NAVSEA) Unmanned Maritime Systems Program Office (PMS 406) LDUUV program. The project demonstrated Command and Control of the LDUUV and Unmanned Aerial Systems (UAS) from the same workstation, increasing effectiveness and efficiency. The common controller will enable easy integration of emerging government and commercial capabilities into the host platform. The team used the results of this project to inform future developmental efforts. The results transitioned to NAVSEA PMS 406. •High Definition (HD) Glass: Completed design of a HD heads up display that integrates with the Android Tactical Assault Kit (ATAK) and the Army's Net Warrior smartphone. The heads up display is used in conjunction with a smart phone to provide real time persistent heads up situational awareness to ground forces. HD Glass transitioned to the U.S. Army. •Query-Score, Export, Assess (Q-SEA) Software: Completed preliminary phase of customized software that will allow U.S. Central Command (USCENTCOM) and U.S. Pacific Command (USPACOM) information operations officers to process more data with improved confidence for assessments and recommendations. Q-SEA will allow users to counter violent extremist organizations' online activities, such as social media interaction used to garner support for terrorist events.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
•Ultra-High Frequency (UHF) Military Satellite Communications (MILSATCOM) Monitor: Completed preliminary design and component procurements for the UHF MILSATCOM Monitor project. This project provides an automated satellite communications monitoring technology that will quickly detect electromagnetic interference and characterize it to allow users to improve countermeasures and enable prompt identification.			
Title: Omni ***Description:*** The Omni project is developing a novel small size, weight and power (SWaP) laser communications (lasercom) system for dismounted units incorporating traditional lasercom features, such as small apertures, jamming resistance and low probability of intercept/detection. In the Omni system, pointing, acquisition and tracking are performed autonomously and are transparent to the user. ***FY 2015 Accomplishments:*** Omni was successful in creating a prototype omni-directional transmitter and demonstrating the technology to gain end-user buy-in. ***FY 2016 Plans:*** Leveraging prior year funds, Omni plans for FY 2016 are to create a prototype imaging receiver and field a functional demonstration to prove near instantaneous acquisition, tracking and decoding of multiple communication signals. The technology will be transitioned to the U.S. Air Force.	1.000	0.000	-
Title: Strategic Multi-Layered Assessment (SMA) Cell ***Description:*** The SMA Cell provides planning support to Combatant Commands (COCOMs) and U.S. Government agencies and provides actionable, systems orientation to complex operational/technical challenges. SMA efforts require multi-agency, multi-disciplinary approaches to address requirements that are not within the customer organization's core competency. The SMA cell identifies solutions from across the U.S. Government, academia and the private sector. SMA efforts are facilitated by the Joint Staff/J-3 and are executed by the Rapid Reaction Technology Office. ***FY 2015 Accomplishments:*** The SMA cell completed a short term effort to assess the appeal of Islamic State in Iraq and the Levant (ISIL) at the request of Commander, Special Operations Command Central (SOCCENT). This study provided an understanding of the psychological, ideological, narrative, emotional, cultural and inspirational ("intangible") nature of ISIL. The effort found that there has been no consensus on the set factors that define the appeal of ISIL. At SOCCENT's request, Phase II effort addressed what the Middle	2.000	2.000	2.000

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
East will look like, and how it is likely to operate after the ISIL threat has been defeated and the Syrian Civil War has come to an end. Products from both assessments have been delivered to SOCCENT. ***FY 2016 Plans:*** Support for the Commander, Special Operations Command Central will continue in FY 2016 with a short term "Proof-of-Concept" effort to evaluate and assess options that include the "Cognitive Spaces" along with narrative-based Information Operations (IO). The IO objectives are to disrupt ISIL leadership's ability to command and control forces, and to neutralize their ability to maintain or increase moral, political, and financial support and recruit foreign fighters; and, ultimately to psychologically isolate ISIL leadership from one another and their respective constituencies inside and outside of the organization. The effort will assess the value of "integrated neuro-cognitive-narrative maneuver" approaches to produce messages that are more likely to have intended effects and less likely to have undesirable unintended or collateral effects; deliver messages more effectively and efficiently by developing campaigns that achieve undercutting effects (i.e., leadership fragmentation, organizational fracture, separating population from the organization); and achieve positive coalition effects. The SMA cell will continue to actively work with the COCOMs and the Joint Staff to identify challenging problems that are not within the traditional areas of the Department of Defense (DoD) expertise. These problems will be in direct support of COCOM senior leadership and may include areas such as: counter terrorism; transnational criminal organizations; counter weapons of mass destruction (state and non-state); counter global or regional social and cultural assessments; regional stability assessments; and, individual state or national level deterrence studies. ***FY 2017 Plans:*** The SMA cell will continue to actively work with the COCOMs and the Joint Staff to identify challenging problems that are not within the traditional areas of DoD expertise. These problems will be in direct support of COCOM senior leadership and may include areas such as: counter terrorism; transnational criminal organizations; counter weapons of mass destruction (state and non-state); counter global or regional social and cultural assessments; regional stability assessments; and, individual state or national level deterrence studies.			
Title: Biometrics and Forensics Science and Technology ***Description:*** The focus area for Biometrics and Forensics Science and Technology projects will field prototypes that address the emerging technology gaps that limit our ability to quickly and accurately identify anonymous individuals who threaten our physical and virtual assets, overseas or in the United States. The overall goal of projects is to reduce future operational risk to warfighters by allowing them to identify bad actors by developing new technologies and approaches or countering adversaries' attempts to mitigate our current technologies. These projects will leverage techniques such as spiral prototyping, increased use of small businesses, and increased competition between vendors as outlined in Better Buying Power 3.0. Biometrics and forensics projects will mature emerging technologies that support evolving identity operations and forensic capabilities required by Commanders and warfighters in ongoing and future military activities. These efforts leverage the Reliance 21 model to encourage	3.500	3.300	3.300

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collaboration on biometrics and forensics projects within the DoD, with interagency partners, with our partners in industry and academia; and, cooperation with international partners where applicable. This model will help maximize collaborative investment and prevent redundant research. Deliverables are shared throughout the biometrics and forensics communities.

FY 2015 Accomplishments:

The biometric portfolio developed technologies to close capability gaps and mitigate emerging threats in the areas of: increasing standoff distance for collection of biometric data; exploration of the use of emerging biometric identification modalities; collection of biometric data from non-cooperative subjects; and, improving the matching accuracy of non-ideal biometric data. The biometric portfolio also supported the final phases of technology transfer of the Biometrically Enabled Watchlist (BEWL) Dissemination Management Server to the Army's Biometrics Identity Management Activity (BIMA). The forensic portfolio supported development of capabilities to mitigate emerging threats and to close gaps identified by commanders in the areas of: faster collection of forensic data; improving accuracy of analysis of data; expanding the types of forensic data collected; and, increasing the amount of analyses that can be done in a field environment vice a laboratory environment. These included investments in the technologies that support digital and cyber forensics that allow the DoD to improve its capabilities to identify and individualize bad actors on the digital battlefield. The forensic portfolio managed the technology development efforts required to enable human identification and characterization capabilities and development of next generation genomic analysis technology. This included research in support of the personnel accounting community through extended kinship analysis research that is critical to the identification of the remains of fallen Service members from prior conflicts. Additional projects for biometrics and forensics portfolios were selected after coordination throughout DoD and across other U.S. Government departments and agencies to maximize collaborative investment and prevent unnecessary redundant research.

FY 2016 Plans:

The biometric portfolio will continue to mitigate gaps identified by commanders and operational users to improve capabilities in the areas of increasing standoff distance for collection of biometric data, exploration of the use of emerging biometric identification modalities, collection of biometric data from non-cooperative subjects, and improving the matching accuracy of non-ideal biometric data. The biometric portfolio will also support the final phases of technology transfer of the BEWL Dissemination Management Server. The forensic portfolio will mitigate gaps identified by commander’s capabilities documents to mitigate emerging threats and to support the faster collection of forensic data, the improvement of the accuracy of analysis of data, the expansion of the types of forensic data collected, and increasing the amount of analysis that can be done in a field environment vice a laboratory environment. The forensic portfolio will manage the technology development efforts that support digital and cyber forensics to help protect DoD’s networks as well as those within the defense industrial base. It will also support those technologies required to enable human identification and characterization capabilities and development of next generation genomic analysis technology. This portfolio will also continue supporting the personnel accounting community by helping to develop technologies that support locating and subsequent identification of the remains of fallen Service members from prior conflicts. Additional projects for

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biometrics and forensics portfolios will be selected after coordination throughout DoD and across other U.S. Government departments and agencies to maximize collaborative investment and prevent unnecessary redundant research. ***FY 2017 Plans:*** The biometrics and forensics science and technology portfolio will continue to mitigate gaps identified by commanders and operational users and improve capabilities in the areas of biometrics and forensics. Projects for biometrics and forensics portfolios will be selected after coordination throughout DoD and across other U.S. Government departments and agencies to maximize collaborative investment and prevent unnecessary redundant research.			
Title: Faster Short Tandem Repeat (FaSTR) Human Deoxyribonucleic Acid (DNA) Profiling System ***Description:*** FaSTR uses a novel approach to achieve faster, lower cost, and portable human DNA analysis. This two phase project will develop a portable compact disc player-sized instrument to control the flow of human DNA and chemistry through centrifugal speed. The goal is to generate a DNA profile from "sample in" to "answer out" in less than 30 minutes and provide a match probability of one in fifty million people. ***FY 2015 Accomplishments:*** Phase I delivered proof of concept demonstrations of extraction, Polymerase Chain Reaction (PCR) amplification, and separation/ detection/allele calling using three separate subsystems. This phase delivered a Technology Readiness Level (TRL) Three instrument (three subsystems) that demonstrated proof of concept for design, chemistry, hardware and software control. These are micro devices for metering/mixing of reagents/sample and full genetic analysis of five loci. FaSTR also delivered sample analysis (system control) and profile generation (allele calling) software scalable to the full system. Phase I successfully demonstrated the proof-of-concept of using centrifugally-driven microfluidics to eliminate mechanical valves and pressure-driven flow allowing Commercial Off-the-Shelf (COTS) compact disc player electronics to drive chemistry (metering, mixing and reaction) for a range of applications. The project developed critical subsystems for Phase II devices and systems designed to run samples at less than $20 per sample and produce hardware systems under $5,000. ***FY 2016 Plans:*** There will be two Phase II variants in FY 2016, each taking the results from Phase I and customizing the design for Human DNA identification and explosives detection. Variant 1 of Phase II will integrate the subsystems and seek opportunities to probe six Short Tandem Repeat (STR) loci to provide random match probabilities of one in about 50 million. In addition, this phase will test and design modifications and optimizations to the initial prototypes delivered in Phase I. Test results will be reported back to project leaders for additional hardware and chemistry design modifications and optimizations to support a transition decision. Variant 2 of Phase II will seek opportunities to develop an operational prototype of an automated and integrated handheld device that will simultaneously test and identify not less than seven explosives commonly encountered in operational environments, and perform on-site, automated explosives identification within 10 minutes. Phase III (final phase) will deliver and transition to	0.100	0.800	-

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defense and intelligence organizations field-testable prototypes. The FaSTR prototype will be a handheld DNA device capable of conducting DNA sample-to-results analysis in less than 30 minutes and reduce overall life-cycle cost. The Variant 2 ExploDisc prototype will be a handheld explosive detection device capable of automatically testing and identifying seven explosives that are commonly encountered in operational environments within 10 minutes.			
Title: Innovation Outreach Program	3.000	3.250	3.500
Description: The Innovation Outreach Program supports the DoD Better Buying Power objectives by leveraging technology and emerging products developed by small, innovative businesses in the commercial sector. Solutions from nontraditional emerging technology companies will be sought in support of critical Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping (DASD(EC&P)) and RRTO objectives. Innovation Outreach will also support DoD Directorates and Program Offices by exposing potential solutions that solve current needs and deficiencies. The Innovation Outreach program will support the Department's objectives of promoting effective competition and fielding affordable capabilities by developing new sources of innovation from commercial research and development investments. Solutions are sought from innovative companies across the U.S. working in a broad spectrum of technology areas. The Innovation Outreach program will include support of emerging capabilities in communications, data and data analysis, alternative energy, autonomy, robotics, imagery, sensors, social networking and other areas identified during the execution years. ***FY 2015 Accomplishments:*** Innovation Outreach conducted five engagements focused on finding commercial solutions to stated problem sets for various Department of Defense (DoD) organizations, including U.S. Army Night Vision Laboratory, the Anti-Personnel Landmine Alternative Working Group and Special Operations Command. Topics addressed include data analytics, sensors, innovative materials, information technology, communications, modelling and simulation, power & energy and autonomy. ***FY 2016 Plans:*** Innovation Outreach Program investment decisions are made during the execution years in response to DASD(EC&P), Rapid Reaction Technology Office (RRTO), Department, Combatant Commands (COCOM), Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Innovation Outreach will execute five engagements with DoD users and interagency partners based on priorities identified in the execution year. Engagements will include DASD(EC&P), DoD Cyber Strategy, Joint Improvised-Threat Defeat Agency (JIDA), and the National Aeronautics and Space Administration. ***FY 2017 Plans:*** Innovation Outreach Program investment decisions are made during the execution years in response to DASD(EC&P), RRTO, Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities			

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are presented. Innovation Outreach will execute five engagements with DoD users and interagency partners based on priorities identified in the execution year.			
Title: Open Source Data Analysis and Applications Focus Area ***Description:*** Open Source Data Analysis and Applications projects include the development of capabilities, software, and tools to analyze open source information. The data can be structured or unstructured and will include inputs from a broad spectrum of sources. Technologies developed within this focus area will reduce cost and manpower requirements to provide meaningful intelligence in support of Counter-Islamic State of Iraq and the Levant (ISIL), counter-weapons of mass destruction and counter-improvised explosive device missions. ***FY 2016 Plans:*** Rapid Reaction Fund (RRF) investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. RRF will support development of open source data analysis tools and applications. The program anticipates supporting six to eight projects. Deliverables will include capabilities and tools to exploit open source information and to reduce manpower required to provide actionable intelligence. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. RRF will support development of open source data analysis tools and applications. The program anticipates supporting six to eight projects. Deliverables will include capabilities and tools to exploit open source information and to reduce manpower required to provide actionable intelligence.	-	6.516	6.380
Title: Autonomous Systems and Behaviors Focus Area ***Description:*** Autonomous Systems and Behaviors projects include power systems to facilitate increased performance of unmanned systems, enhanced capabilities for multiple autonomous systems to cooperatively interact, development of sensors for integration aboard unmanned platforms, improvements to data ex-filtration from unmanned sensors, operation in denied areas and “red teaming” to counter emerging unmanned threats from potential adversaries. These projects will also examine the establishment of common software platforms to reduce development cost, increase collaboration among disparate unmanned vehicles, support rapid customization of autonomous systems’ architectures and inform development decisions for the autonomy community of interest. ***FY 2016 Plans:***	-	4.816	5.380

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RRF investment decisions are made during the execution years in response to Department, Combatant Commands (COCOM), Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. The Rapid Reaction Fund (RRF) will support development of unmanned autonomous aerial, surface, and subsurface systems. Anticipate supporting four to six projects. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. The RRF will support development of unmanned autonomous aerial, surface, and subsurface systems. Anticipate supporting four to six projects.			
Title: Urban Characterization Focus Areas ***Description:*** Future military operations will likely occur in a broad range of urban environments in areas where we are denied free access. Urban Characterization Focus Area projects will identify, analyze and describe typical urban areas for modeling, simulation and planning purposes. These efforts will inform and enable development of Intelligence, Surveillance and Reconnaissance (ISR), electronic warfare, kinetic/non-kinetic and other capabilities needed for future military operations in a wide range of urban areas. ***FY 2016 Plans:*** The RRF investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. The Rapid Reaction Fund (RRF) will support development of open source data analysis tools and applications. Anticipate supporting three to five projects. Deliverables will include modeling and simulations systems to support planning efforts. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. RRF will support development of open source data analysis tools and applications. The program anticipates supporting three to five projects. Deliverables will include modeling and simulations systems to support planning efforts.	-	2.919	2.880
Title: Intelligence, Surveillance and Reconnaissance (ISR) Focus Area ***Description:*** ISR sensors span a wide range of sensing modalities and generally produce very large data sets that are difficult to analyze. Efforts in this area will develop better sensors and tools to more effectively analyze or visualize ISR data. Projects include improved surveillance sensors, tools to facilitate analysis of large data sets, methods to harvest meaningful intelligence from open and classified sources and establishment of more effective processing, exploitation and dissemination capabilities to facilitate integration of new and existing systems. Projects in this area generally involve high risk and have high potential reward;	-	4.332	5.080

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and, are not being addressed by other organizations. Projects will also explore technologies to improve ISR in denied areas. ISR projects will also evaluate methods of increasing the effectiveness of ISR architectures to maximize the capability delivered to the user and to reduce the amount of human analyst manpower required to produce actionable intelligence. ***FY 2016 Plans:*** The RRF investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future ISR capabilities. Anticipate supporting five to seven projects. Deliverables will include prototype systems and software for a variety of platforms, as well as analytical capabilities developed to reduce the manpower burden needed to process large sets of ISR data. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future ISR capabilities. Anticipate supporting six to eight projects. Deliverables will include prototype systems and software for a variety of platforms, as well as analytical capabilities developed to reduce the manpower burden needed to process large sets of ISR data.			
Title: Additive Manufacturing Focus Area ***Description:*** This focus area will develop the enabling capabilities and key technologies required to advance additive manufacturing technology. Additive manufacturing projects are those that use processes in which successive layers of material are laid down under computer control to create functional three dimensional products. The Rapid Reaction Technology Office will leverage the innovative capabilities of Federally Funded Research and Development Centers (FFRDCs), government laboratories, academia and industry to develop proof of principal prototypes in this emerging field. Projects include spare part replacement, jet engine repair, custom hardware enclosures, and three-dimensional (3-D) models. Products in this area are generally revolutionary and are not being addressed by other organizations. Projects have the potential to significantly reduce the supply chain inefficiencies by storing parts as software and manufacturing on demand, and using rapid prototyping to reduce time and cost of design. Projects can also reduce amount of human manpower required to produce functioning prototypes. Deliverables will inform enhancement decisions and concept of operations development. ***FY 2016 Plans:*** Rapid Reaction Fund (RRF) investment decisions are made during the execution years in response to Department, Combatant Commands (COCOMs), Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout Department of Defense (DoD) and other government	-	3.417	4.080

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
agencies will help identify areas critical to developing future capabilities of interest within the additive manufacturing field to multiple federal organizations. Anticipate supporting six to eight projects ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future capabilities of interest within the additive manufacturing field to multiple federal organizations. Anticipate supporting seven to nine projects.			
Title: Undersea Warfare and Technology Focus Area ***Description:*** This focus area will develop the enabling capabilities and key technologies required to maintain undersea dominance, drawing on the recommendations of the Long-Range Research and Development Program Plan under the Defense Innovation Initiative. Major drivers in the undersea domain include the development of extra-large, large, and small families of multi-mission unmanned undersea vehicles (UUVs) and the rapid growth of commercial undersea activity. The DoD is exploring emerging concepts for ubiquitous undersea communications, command and control, and large-scale UUV capabilities. In order to enable these concepts, RRF will focus on developing capabilities and technologies such as undersea power production, storage and distribution; enhanced signal processing; autonomy; undersea situational awareness and navigation; sensors; undersea communications; and advanced materials development and production. Projects in this area are generally short term, high risk and high pay-off. ***FY 2016 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future capabilities of interest within the undersea technology field to multiple federal organizations. Anticipate supporting six to eight projects. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future capabilities of interest within the undersea technology field to multiple federal organizations. Anticipate supporting six to eight projects.	-	7.410	7.490
Title: Interface of Military Operations with Law Enforcement and Border Protection Focus Area ***Description:*** Interface of Military Operations with Law Enforcement and Border Protection projects include collaboration and exercises with law enforcement organizations to identify overlap and synergies between military and law enforcement operations,	-	2.119	2.880

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	**Project (Number/Name)** P828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
exploitation of law enforcement data for use in an irregular warfare environment, development of improved border protection capabilities that can be used in military base protection and expanding the capabilities of biometrics and forensics tools. ***FY 2016 Plans:*** Rapid Reaction Fund (RRF) investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future capabilities of interest to multiple federal organizations. Anticipate supporting three to four projects. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOMs, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify areas critical to developing future capabilities of interest to multiple federal organizations. Anticipate supporting four to five projects.			
Title: Red Teaming in Support of Emerging Capabilities Focus Area ***Description:*** Red Teaming projects assess the susceptibility of emerging capabilities defeat by parties not intimately familiar with the technology. The Rapid Reaction Technology Office (RRTO) will leverage the innovative capabilities of Federally Funded Research and Development Centers (FFRDCs), government laboratories, academia and industry to develop a construct that current or future systems can be gamed against in a distributed table-top environment employing traditional and non-traditional players. Deliverables will inform enhancement decisions and concept of operations development. ***FY 2016 Plans:*** The Rapid Reaction Fund (RRF) investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout DoD and other government agencies will help identify key technologies and systems to be assessed by red teams. Deliverables will include recommendations on system operational employment, potential vulnerabilities, and likely countermeasures taken by the threat as well as potential counter-countermeasures to increase functionality or operational effectiveness of the system. Projects will include Red Team efforts employing government laboratory scientists, subject matter experts and undergraduate students of Science, Technology, Engineering, and Math (STEM) disciplines to explore unconventional approaches to counter DoD technologies. Anticipate supporting five to six projects. ***FY 2017 Plans:*** RRF investment decisions are made during the execution years in response to Department, COCOM, Service and other government organizations' priorities and as new threats emerge or new opportunities are presented. Research and coordination	-	3.547	4.380

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	**Project (Number/Name)** P828 / *Rapid Reaction Fund*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
with organizations throughout DoD and other government agencies will help identify key technologies and systems to be assessed by red teams. Deliverables will include recommendations on system operational employment, potential vulnerabilities, and likely countermeasures taken by the threat as well as potential counter-countermeasures to increase functionality or operational effectiveness of the system. Projects will include Red Team efforts employing undergraduate students of STEM disciplines to explore unconventional approaches to counter DoD technologies. Anticipate supporting six to seven projects.			
Accomplishments/Planned Programs Subtotals	34.225	44.426	47.350

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In FY 2017, performance metrics applicable to the Rapid Reaction Fund (RRF) include attainment of DoD Strategic Objective 3.5.2D. The title of this objective is "Maintain a strong technical foundation within the Department's Science and Technology program" and the metric for this objective is the transition of 40 percent of completed projects per year. In addition, project performance metrics are specific to each effort and include measures identified in each specific project plans. Project completions and successes are monitored against schedules and deliverables stated in the proposals and statements of work. The metrics include items such as target milestone dates, specific performance measures, fielding dates and demonstration goals. For projects completed in FY 2015, the RRF achieved a transition rate of approximately 75 percent.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	Project (Number/Name) P831 / *Joint Rapid Acquisition Cell Support*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P831: *Joint Rapid Acquisition Cell Support*	4.859	1.554	1.620	1.636	-	1.636	1.652	1.669	1.686	1.703	Continuing	Continuing

A. Mission Description and Budget Item Justification

This funding includes support for the Joint Rapid Acquisition Cell (JRAC) to enable management and tracking of Combatant Command (COCOM) identified and Joint Staff validated immediate warfighter needs. The JRAC is responsible to:
(1) Coordinate review of validated Joint Urgent Operational Needs (JUON) and Joint Emergent Operational Needs (JEON) and assign responsibility to appropriate DoD Components for timely funding and resolution.
(2) Serve as the review and approval authority for the DoD Components' strategy to fund and mitigate the identified JUON/JEON capability gap.
(3) Continually assess actions taken by the DoD Components to resolve JUONs/JEONs and recommend to the Under Secretary of Defense for Acquisition, Technology, and Logistics any changes determined appropriate to improve their responsiveness to JUONs/JEONs.
(4) Provide periodic reports to the Secretary of Defense on new and outstanding JUONs/JEONs.
(5) In coordination with Under Secretary of Defense Comptroller (USD(C)), manage the Rapid Acquisition Fund (RAF) to allocate resources to priority unfunded JUONs/JEONs.
(6) In coordination with the Office of the Chairman of the Joint Chiefs of Staff and the USD(C), make programmatic, budget, and acquisition recommendations for JUONs and identify capability gaps to the Secretary of Defense.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Rapid Acquisition Cell (JRAC) Management Support	1.554	1.620	1.636
Description: This funding is utilized to support the staff manning of the JRAC to enable management and tracking of COCOM identified and Joint Staff validated immediate warfighter needs.			
FY 2015 Accomplishments: Supported the JRAC to enable management and tracking of immediate COCOM warfighter requirements. Warfighter needs were validated by the Joint Staff.			
FY 2016 Plans: Continue support for the JRAC management and tracking of COCOM initiatives. Continue validation of the warfighter needs by the Joint Staff.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	**Project (Number/Name)** P831 / *Joint Rapid Acquisition Cell Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Continue support for the JRAC management and tracking of COCOM initiatives. Continue validation of the warfighter needs by the Joint Staff.			
Accomplishments/Planned Programs Subtotals	1.554	1.620	1.636

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

NA – Capabilities acquired to fulfill Joint Urgent Operational Needs (JUON) and Joint Emergent Operational Needs (JEON) are provided by other DoD components.

E. Performance Metrics

Joint Rapid Acquisition Cell performance metrics are specific to each JUON/JEON and include measures identified in the management approach for each action. In addition, JUON/JEON completions and successes are monitored against schedules and deliverables stated in the management approach. The metrics to which JRAC support correlates is to the number of full time personnel identified in the JRAC support contract with associated pay rates and shall not exceed the specified amounts or hourly rates and/or firm fixed price.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	Project (Number/Name) P833 / *Strategic Multi-Layered Assessment (SMA) Support*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P833: *Strategic Multi-Layered Assessment (SMA) Support*	4.175	2.179	2.062	2.282	-	2.282	2.305	2.328	2.351	2.375	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Strategic Multi-Layered Assessment (SMA) Cell supports all Combatant Commands (COCOMs), Joint Force Commanders and other government agencies by assessing complex operational/technical challenges, which require collaborative multi-agency and multi-disciplinary approaches. With input from across the U.S. Government, academia and the private sector, the SMA cell develops solution options to COCOM generated challenging problems and informs the command's senior leadership. Each SMA effort is initiated at the request of senior COCOM leadership. Priorities for SMA problems are set by the Joint Staff Deputy Director for Global Operations. Products are typically produced within six months and directly contribute to the decision making process of COCOM's senior leaders. SMA is also supported by the Rapid Reaction Fund (RRF).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Assessing “Gray Zone” Conflicts for the United States Security Coordinator, U.S. European Command (USEUCOM), U.S. Strategic Command (USSC), and U.S. Special Operations Command (USSOCOM)	2.179	2.062	2.282
Description: The SMA Cell conducted an effort starting in FY 2015 at the request of the USSC for Israel and the Palestinian Authority. The effort evaluated strategic risks and identified knowledge gaps in order to provide an increased understanding of potential future security environments and their implications for Palestinian security sector reform. USEUCOM subsequently asked SMA to apply the same methodology to identify emerging Russian threats and opportunities in Eurasia. USSOCOM initiated work based on those two efforts focused on developing strategies and response options for “Gray Zone” conflicts.			
FY 2015 Accomplishments: The project provided an increased understanding of potential future security environments and their implications for Palestinian security sector reform. The SMA team conducted a multi-disciplined review of USSC challenges and provided to the USSC staff a series of insights and recommendations that enabled them to derive a rich contextual understanding of the socio-political, social-cultural, security and economic dynamics of the region. The SMA team also conducted a successful simulation with the participation of both USSC staff and high-level subject matter experts in Washington, London and Jerusalem. As the capstone of the SMA project, the team developed social media content, analyzed the simulation from neuro/psychological perspectives and provided background materials on Palestinian security forces. The USSC participants indicated the scenario realistically portrayed some of the dilemmas they face in real life and the exercise was a valuable, thought-provoking and novel way to engage these issues. The USSC staff requested this simulation be used in the future to train incoming USSC staff. Based on the analytical methods, the framework development, and the models developed during the USSC Coordinator’s Mission Review, the USEUCOM J5 requested that the SMA team undertake an effort to identify emerging Russian threats and opportunities in Eurasia. The study examined future political, security, societal and economic trends to determine where U.S. interests are congruent			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	**Project (Number/Name)** P833 / *Strategic Multi-Layered Assessment (SMA) Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
or in conflict with Russian interests, and in particular, detected possible leverage points when dealing with Russia in a “global context.” Additionally, the analysis considered where North Atlantic Treaty Organization interests are congruent or in conflict with Russian interests. Building on the findings from the completed EUCOM effort, U.S. Special Operations Command (USSOCOM) requested the SMA team start an effort to diagnose, identify, and assess indirect strategies, and develop response options against associated types of “Gray Zone” conflicts. A "Gray Zone" conflict is the purposeful, ambiguous, aggressive, integrated use of multiple elements of power by an adversary to achieve its objectives that exceed the threshold of normal peacetime competition yet fall below the level of major war. This “Gray Zone” effort will continue in FY 2016. The cell also continued to actively work with the Combatant Commands (COCOMs) and the Joint Staff to identify challenging problems that are not within the traditional areas of DoD expertise. These problems directly supported the COCOMs and included areas such as: counter terrorism; transnational criminal organizations; counter weapons of mass destruction (state and non-state); counter global or regional social and cultural assessments; regional stability assessments; and, individual state or national level deterrence studies.			
FY 2016 Plans: The SMA Cell, at the request of the USSOCOM Commander, will continue an effort to assess how the U.S. Government can diagnose, identify, and assess indirect strategies, and develop response options against associated types of “Gray Zone” conflicts. Specifically, if the U.S. Government is to respond effectively to the threats and opportunities presented in the increasingly Gray security environment, it requires a much more detailed map of the space between peace and war than it currently possesses. The project will provide a more rigorous and comprehensive articulation of the space between militarized conflict and peace. The project team will conduct a quantitative analysis of historical antecedents of such occurrences and its contemporary manifestations and geopolitical drivers. The team will assess what the specific U.S. experience has been with Gray Zone conflicts and what strategies and tactics have been most and least successful as instruments of U.S. policy. The team will also explore the nature of the capabilities - conceptual, procedural and physical - necessary for navigating this Gray space. The SMA team will identify how the various elements of power need to be coordinated to effectively respond to Gray Zone conflicts; examine interests, resources, and capabilities of Violent Extremist Organizations and Transnational Criminal Organizations in gray zone regions. The SMA team also will initiate a case study to examine the behavior of select state and non-state actors (e.g. Russia and Daesh (ISIS)) in gray zone conflicts as related to their indirect strategic objectives to identify indicators of increasing aggression, ambiguity, integrated use of elements of power, decreasing collaboration with adversaries, and destructive leadership. Products from the effort will be provided to SOCOM, and all other COCOMs. The cell will continue to actively work with the COCOM's senior leadership and the Joint Staff leadership to identify challenging problems that are not within the traditional areas of DoD expertise. These problems will be in direct support of the COCOMs and may include areas such as: counter terrorism; transnational criminal organizations; counter weapons of mass destruction (state and non-state); counter global or regional social and cultural assessments; regional stability assessments; and, individual state or national level deterrence studies.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603826D8Z / *Quick Reactions Special Projects (QRSP)*	**Project (Number/Name)** P833 / *Strategic Multi-Layered Assessment (SMA) Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The SMA Cell will complete its efforts to assess and respond to "Gray Zone" conflicts in FY 2017 and transition the products to the USSOCOM Commander. The cell will continue to actively collaborate with COCOM senior leadership and the Joint Staff leadership to identify challenging problems that are not within the traditional areas of DoD expertise. These problems will be in direct support of the COCOMs and may include areas such as: counter terrorism; transnational criminal organizations; counter weapons of mass destruction (state and non-state); counter global or regional social and cultural assessments; regional stability assessments; and, individual state or national level deterrence studies.			
Accomplishments/Planned Programs Subtotals	2.179	2.062	2.282

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

SMA performance metrics are specific to each effort and include measures identified in the specific project plans. In addition, project completions and successes are monitored against schedules and deliverables stated in the execution documents. Each project's results are reviewed by a senior review group that is comprised with representatives from the Office of the Secretary of Defense, the Joint Staff, the COCOMs, and outside subject matter experts. The ultimate measure of success is adoption and transition of SMA products by the COCOM and supporting entities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603832D8Z *I DoD Modeling and Simulation Management Office*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	88.944	2.908	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
P476: *DoD Modeling and Simulation Management Office*	88.944	2.908	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Modeling and Simulation (M&S) is a key enabler of DoD capabilities; underpins innovative solutions meeting real-world national security challenges; acts as a force multiplier; saves resources; and saves lives. The DoD Modeling and Simulation Management Office (MSMO), designated by the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) to be the focal point and advocate for DoD M&S, enhances the DoD M&S Enterprise by (1) enabling cooperation and collaboration in identifying, developing and sustaining modeling and simulation solutions; and (2) promoting technology solutions, including common M&S architectures, standards, and services that improve interoperability, reuse, and cost effectiveness of DoD M&S.

In FY 2016, this Program Element (PE) will be transferred to a new PE 0603833D8Z entitled, "Engineering Science and Technology" in order to support the Deputy Assistant Secretary of Defense (Systems Engineering) priorities -- to “grow engineering capabilities to address emerging Defense challenges” and to “champion systems engineering as a tool to improve acquisition quality.” Engineering science and technology, including modeling and simulation (M&S) and systems engineering (SE) research, support the cost-effective acquisition of complex systems and the full range and scope of Department of Defense (DoD) missions and operations.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	2.995	0.000	0.000	-	0.000
Current President's Budget	2.908	0.000	0.000	-	0.000
Total Adjustments	-0.087	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.086	-			
• FY15 Reprog. for Cancelled Account	-0.001	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603832D8Z / *DoD Modeling and Simulation Management Office*	Project (Number/Name) P476 / *DoD Modeling and Simulation Management Office*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P476: *DoD Modeling and Simulation Management Office*	88.944	2.908	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Modeling and Simulation (M&S) supports the full range and scope of the Department of Defense (DoD) missions and operations. M&S is a key enabler of DoD capabilities; underpins innovative solutions meeting real-world national security challenges, and saves resources. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), under the authority of DoD Directive 5134.01, designated the DoD Modeling and Simulation Management Office (MSMO) to be the focal point and advocate for Defense M&S to enhance the Defense M&S Enterprise by (1) enabling cooperation and collaboration in identifying, developing and sustaining modeling and simulation solutions; and (2) promoting technology solutions, including common M&S architectures, standards, and services that improve interoperability, reuse, and cost effectiveness of DoD M&S. MSMO executes its efforts in accordance with the USD(AT&L)-promulgated DoD Directive 5000.59, "Management of Modeling and Simulation" and DoD Instruction 5000.70, "Management of DoD Modeling and Simulation (M&S) Activities;" and other DoD Issuances, including DoD 4120.24-M, "DoD Standardization Program (DSP) Policies and Procedures" and DoD Instruction 3200.14, "Principles and Operational Parameters of the DoD Scientific and Technical Information Program."

MSMO is responsible for:
• Planning, coordinating, and managing funds to support enterprise-level M&S activities that guide the Defense M&S Community to achieve the DoD Strategic Vision for M&S.
• Bringing together M&S stakeholders to advise and assist on finding solutions for removing the barriers to interoperability, reuse, commonality, efficiency, and effectiveness.
• Developing, coordinating, and advocating for, with advice and assistance from the DoD M&S Steering Committee, policy/guidance, technology, standards, best practices, and strategic planning processes that promote interoperability and reuse across the Department.

MSMO also serves as DoD's:
• Focal point and advocate for coordinating M&S information exchanges and interactions within DoD, with other U.S. Government departments and agencies, international allies, industry and academia.
• Lead Standardization Activity (LSA) for managing M&S standards and methodologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: DoD Modeling and Simulation Management Office (MSMO)	2.908	-	-
Description: MSMO, as the USD(AT&L)-designated focal point for Defense modeling and simulation (M&S), is responsible for maintaining and enhancing policies, standards, technology, and collaboration to ensure the efficiency and effectiveness of the M&S that supports the full range and scope of Defense missions and operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603832D8Z / *DoD Modeling and Simulation Management Office*	**Project (Number/Name)** P476 / *DoD Modeling and Simulation Management Office*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: In FY 2015, MSMO focused on M&S technical advocacy and enterprise-level support. Traditionally, the MSMO provided R&D project funds to OSD, Military Department and Agency community organizations to develop solutions for identified M&S challenges. The requested FY 2015 budget reflected the revised budget for MSMO to: (1) conduct management and technical support for the Department's current and long-term M&S needs; (2) study opportunities to leverage relevant DoD Information Technology (IT) enterprise capabilities and DoD-, Industry-, and Academia-developed M&S technologies; and (3) continue to advocate an enterprise approach for the future of DoD M&S, maintaining strong engagement and ties with DoD and external community stakeholders. MSMO structured its FY 2015 efforts in four categories: policy and guidance, standards, technology, and collaboration, as follows: Policy and Guidance: • Updated policy and guidance to require engagement with Test and Evaluation with the Defense M&S Catalog. Technology: • Developed, enhanced, and advocated the M&S enterprise suite of tools, including achieving full operational capability of the Defense M&S Catalog. • Chaired M&S Community of Interest and working groups fostering Defense-wide collaboration, including: o Architecture: technical activities in simulation interoperability and architectures. o Cyber M&S: cyber and traditional kinetic Live, Virtual, Constructive (LVC) interoperabilty; and modeling of cyber attacks and effectiveness. Collaboration: • Represented the U.S. interests in Interagency, and International M&S activities, e.g.: o Chaired The Technical Cooperation Program (TTCP) Joint Systems and Analysis Group (JSA) Technical Panel for Modelling and Simulation (TP-2), addressing issues such as Coalition Simulation Interoperability, Electronic Warfare, and Cyber M&S. o Served as the US Principal Voting Member for the NATO M&S Group (NMSG) and participated in NMSG task groups including M&S as a Service, M&S Technology Roadmap, and M&S for Cyber Defense. o Furthered bilateral partnerships with other international M&S organizations including the Republic of Korea Defense Agency for Technology and Quality (DTaQ) High Level Architecture (HLA) compliance testing.			
Accomplishments/Planned Programs Subtotals	2.908	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603832D8Z / *DoD Modeling and Simulation Management Office*	**Project (Number/Name)** P476 / *DoD Modeling and Simulation Management Office*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance in this program is monitored in the following ways:

- Number of instances where M&S standards, technical best practices, or tools have been adopted or employed.
- Number of M&S resources (tools, data, and services) made visible or updated in the DoD M&S Enterprise Catalog for reuse and the completeness of each record according to DoD discovery metadata standards.
- Number of users accessing and completing DoD-sponsored training venues for educating the M&S workforce.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	18.341	17.659	-	17.659	19.413	19.927	19.999	15.107	Continuing	Continuing
P401: *DoD Modeling and Simulation Management Office*	0.000	0.000	3.341	3.158	-	3.158	4.519	4.927	5.102	5.186	Continuing	Continuing
P402: *Systems Engineering Research Center*	0.000	0.000	5.000	4.760	-	4.760	4.948	5.000	4.948	4.961	Continuing	Continuing
P403: *Engineered Resilient Systems*	0.000	0.000	10.000	9.741	-	9.741	9.946	10.000	9.949	4.960	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) was created in FY 2016 to better align the following efforts previously funded in other PE's: (1) the Modeling and Simulation Management Office project previously funded from PE 0603832D8Z; (2) the Systems Engineering Research Center (SERC), previously funded in PE 0605142D8Z; and (3) the Engineered Resilient Systems effort, previously funded in PE 0602251D8Z, Applied Research for the Advancement of S&T Priorities. These three activities have been re-aligned to this new PE, Engineering Science and Technology, in order to address Defense Research and Engineering priorities to advance engineering state of the practice, and address complex defense systems challenges through development of engineering capabilities to improve acquisition quality. Engineering science and technology, including modeling and simulation (M&S), systems engineering (SE) research, and engineering capabilities for resilience, supports the cost-effective acquisition of complex systems in support of the full range and scope of Department of Defense (DoD) missions and operations.

M&S is a key enabler of DoD capabilities; underpins innovative solutions meeting real-world national security challenges; acts as a force multiplier; saves resources; and saves lives. The DoD Modeling and Simulation Management Office (MSMO), designated by the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) to be the focal point and advocate for DoD M&S, enhances the DoD M&S Enterprise by (1) enabling cooperation and collaboration in identifying, developing and sustaining modeling and simulation solutions; and (2) promoting technology solutions, including common M&S architectures, standards, and services that improve interoperability, reuse, and cost effectiveness of DoD M&S.

SERC is a University Affiliated Research Center (UARC) established in 2008 as a strategic resource to further systems research and increase its impact on the Department's ability to meet its mission. Greatly improved SE methods, processes and tools are essential to the DoD strategy to field systems that are agile, affordably sustainable, flexible, and ready for a full range of contingencies in the face of declining budgets and a shrinking workforce. The SERC consists of a network of 23 research universities from across the U.S. that work collaboratively to bring the best talent in the nation to bear on DoD's systems engineering research problems.

Engineered Resilient Systems (ERS) addresses the need for achieving more affordable and mission-resilient warfighting systems designed within a shorter time frame by conducting research and development and new concepts for implementing an integrated suite of modern computational engineering tools, modeling capabilities, and tradespace assessment and visualization tools within an architecture aligned with acquisition and operational business processes. These integrated tools will operate

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*

within a framework that supports data-driven decision-making in an innovative environment that enables advanced knowledge management and multi-community collaboration, including data retention and lessons learned.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	18.377	8.761	-	8.761
Current President's Budget	0.000	18.341	17.659	-	17.659
Total Adjustments	0.000	-0.036	8.898	-	8.898
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Baseline Adjustment for Engineered Resilient Systems	-	-	9.035	-	9.035
• FFRDC Reduction	-	-0.036	-	-	-
• Economic Assumptions	-	-	-0.137	-	-0.137

Change Summary Explanation

The FY 2017 baseline adjustment of $9.035M was added for Engineering Resilient Systems to focus on mission-relevant trade-space analysis and cost reduction pre-milestone B.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) P401 / *DoD Modeling and Simulation Management Office*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P401: *DoD Modeling and Simulation Management Office*	0.000	0.000	3.341	3.158	-	3.158	4.519	4.927	5.102	5.186	Continuing	Continuing

A. Mission Description and Budget Item Justification

Modeling and Simulation (M&S) supports the full range and scope of Department of Defense (DoD) missions and operations. M&S is a key enabler of DoD capabilities; underpins innovative solutions meeting real-world national security challenges, and saves resources. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), under the authority of DoD Directive 5134.01, designated the DoD Modeling and Simulation Management Office (MSMO) to be the focal point and advocate for Defense M&S to enhance the Defense M&S Enterprise by (1) enabling cooperation and collaboration in identifying, developing and sustaining modeling and simulation solutions; and (2) promoting technology solutions, including common M&S architectures, standards, and services that improve interoperability, reuse, and cost effectiveness of DoD M&S. MSMO executes its efforts in accordance with the USD(AT&L)-promulgated DoD Directive 5000.59, "Management of Modeling and Simulation" and DoD Instruction 5000.70, "Management of DoD Modeling and Simulation (M&S) Activities;" and other DoD Issuances, including DoD 4120.24-M, "DoD Standardization Program (DSP) Policies and Procedures" and DoD Instruction 3200.14, "Principles and Operational Parameters of the DoD Scientific and Technical Information Program."

MSMO is responsible for:
• Planning, coordinating, and managing funds to support enterprise-level M&S activities that guide the Defense M&S Community to achieve the DoD Strategic Vision for M&S.
• Bringing together M&S stakeholders to advise and assist on finding solutions for removing the barriers to interoperability, reuse, commonality, efficiency, and effectiveness.
• Developing, coordinating, and advocating for, with advice and assistance from the DoD M&S Steering Committee, policy/guidance, technology, standards, best practices, and strategic planning processes that promote interoperability and reuse across the Department.

MSMO also serves as DoD's:
• Focal point and advocate for coordinating M&S information exchanges and interactions within DoD, with other U.S. Government departments and agencies, international allies, industry and academia.
• Lead Standardization Activity (LSA) for managing M&S standards and methodologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: DoD Modeling and Simulation Management Office (MSMO)	-	3.341	3.158
Description: MSMO, as the USD(AT&L)-designated focal point for Defense modeling and simulation (M&S), is responsible for maintaining and enhancing policies, standards, technology, and collaboration to ensure the efficiency and effectiveness of the M&S that supports the full range and scope of Defense missions and operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P401 / *DoD Modeling and Simulation Management Office*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2016 Plans: In FY 2016, MSMO will: (1) conduct management and technical support for the Department's current and long-term M&S needs; (2) respond to opportunities to leverage relevant DoD Information Technology (IT) enterprise capabilities and DoD-, Industry-, and Academia-developed M&S technologies; and (3) continue to advocate an enterprise approach for the future of DoD M&S, maintaining strong engagement and ties with Defense and external community stakeholders. Policy and Guidance: • Initiate and publish updates to DoD Instruction 5000.70 (DoD M&S) and cancel DoD Directive 5000.59. Standards: • Serve as the Lead Standardization Activity for M&S Standards and Methodologies, and/or lead and participate in Defense Standardization Program Office and Joint Enterprise Standards Committee activities and International standards activities such as NATO Standardization Agreements for M&S. Technology: • Develop, enhance, and advocate the M&S enterprise suite of tools. • Chair M&S Community of Interest, Cyber M&S Technical Working Group, and M&S Architecture Working Group. • Develop a Defense M&S Reference Architecture to foster best practices and implement technology insertion into DoD M&S. • Perform technology watch/horizon scanning related to M&S emerging capabilities. Collaboration: • Represent the U.S. interests in International M&S activities: – Chair TTCP Technical Panel Two (M&S). – Serve as the US Principal Voting Member for NATO M&S Group (NMSG) and participate in NMSG task groups. – Simulation Interoperability Standards Organization. • Collaborate with interagency organizations, as required. • Continue development and enhancement of the M&S Catalog, including increased access for federal and coalition partners. ***FY 2017 Plans:*** In FY 2017, MSMO will: (1) conduct management and technical support for the Department's current and long-term M&S needs; (2) respond to opportunities to leverage relevant DoD Information Technology (IT) enterprise capabilities and DoD-, Industry-, and Academia-developed M&S technologies; and (3) continue to advocate an enterprise approach for the future of DoD M&S, maintaining strong engagement and ties with Defense and external community stakeholders.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P401 / *DoD Modeling and Simulation Management Office*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Policy and Guidance: • Initiate and publish updates to DoD Instruction 5000.61 (DoD M&S Verification, Validation, and Accreditation). Standards: • Serve as the Lead Standardization Activity for M&S Standards and Methodologies, and/or lead and participate in Defense Standardization Program Office and Joint Enterprise Standards Committee activities and International standards activities such as NATO Standardization Agreements for M&S. Technology: • Develop, enhance, and advocate the M&S enterprise suite of tools. • Chair M&S Community of Interest, Cyber M&S Technical Working Group, and M&S Architecture Working Group. • Refine the Defense M&S Reference Architecture to maintain consistency with changes to the overall DoD IT policies and infrastructure. • Perform technology watch/horizon scanning related to M&S emerging capabilities. Collaboration: • Represent the U.S. interests in International M&S activities: – Serve as the US Principal Voting Member for NATO M&S Group (NMSG) and participate in NMSG task groups. – Participate in The Technical Cooperation Program (TTCP) Joint Systems & Analysis Group (JSA) Technical Panel 2 on M&S. – Simulation Interoperability Standards Organization. • Collaborate with interagency organizations, as required. • Continue development and enhancement of the M&S Catalog, including updates to the metadata specification to maintain consistency with the DoD IT Standards Registry.			
Accomplishments/Planned Programs Subtotals	-	3.341	3.158

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P401 / *DoD Modeling and Simulation Management Office*

E. Performance Metrics

Performance in this program is monitored in the following ways:

- Number of instances where M&S standards, technical best practices, or tools have been adopted or employed.
- Number of M&S resources (tools, data, and services) made visible or updated in the DoD M&S Enterprise Catalog for reuse and the completeness of each record according to DoD discovery metadata standards.
- Number of users accessing and completing DoD-sponsored training venues for educating the M&S workforce.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) P402 / *Systems Engineering Research Center*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P402: *Systems Engineering Research Center*	0.000	0.000	5.000	4.760	-	4.760	4.948	5.000	4.948	4.961	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Systems Engineering Research Center (SERC) is a University Affiliated Research Center (UARC) established in 2008 as a strategic resource to further systems research and increases its impact on the Department's ability to meet its mission. Greatly improved SE is essential to DoD's strategy to field systems that are agile, affordably sustainable, flexible, and ready for a full range of contingencies in the face of declining budgets and a shrinking workforce.

The SERC's network of universities is led by the Stevens Institute of Technology, and includes the Air Force Institute of Technology, Auburn University, Carnegie Mellon University, Georgetown University, Georgia Institute of Technology, Massachusetts Institute of Technology, Missouri University of Science and Technology, Naval Postgraduate School, North Carolina Agricultural and Technical State University, Pennsylvania State University, Purdue University, Southern Methodist University, Texas A&M University, Texas Tech University, University of Alabama, University of California, University of Maryland, University of Massachusetts, University of Southern California, University of Virginia, and Wayne State University. These Universities work collaboratively to bring the best talent in the nation to bear on DoD's systems engineering research problems.

This effort continues execution of the SERC program previously funded in PE 0605104D8Z and PE 0605142D8Z.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Systems Engineering Research Center	-	5.000	4.760
Description: The SERC is a DoD UARC which conducts University-based research that directly supports DoD's Strategic Plan through development of new systems engineering methods, processes and tools. ***FY 2016 Plans:*** Enhance engineering methods, processes and tools (MPTs) to improve in the following areas: (1) Systems Engineering Transformation: transform current systems engineering methods to enable rapid, concurrent and scalable definition and affordable development of flexible systems that are responsive to changing threats and missions; (2) Enterprises and Systems of Systems: create foundational methods to develop and design enterprises and system of systems to provide an overwhelming competitive advantage over our adversaries; (3) Trusted Systems: secure defense systems from cyber and other threats through systemic security approaches that complement incomplete current perimeter/network defense methods; and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P402 / *Systems Engineering Research Center*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
(4) Human Capital Development: speed the professional development of highly capable systems engineers and technical leaders in the Department and the Defense Industrial Base. ***FY 2017 Plans:*** Continue to enhance engineering methods, processes and tools (MPTs) to improve in the following areas: (1) Systems Engineering Transformation: transform current systems engineering methods to enable rapid, concurrent and scalable definition and affordable development of flexible systems that are responsive to changing threats and missions; - Publish technical report on emerging methods to evaluate system responses under complex uncertainties (2) Enterprises and Systems of Systems: create foundational methods to develop and design enterprises and system of systems to provide an overwhelming competitive advantage over our adversaries; - Publish technical report on foundational methods for development of robust architectures to enable end-to-end mission engineering; (3) Trusted Systems: secure defense systems from cyber and other threats through systemic security and assurance approaches that complement incomplete current perimeter/network defense methods; - Pilot application of composable methods to rapidly assure system performance at a reduced cost (4) Human Capital Development: speed the professional development of highly capable systems engineers and technical leaders in the Department and the Defense Industrial Base. - Publish v1.0 of Atlas, a theory that identifies the factors that make systems engineers effective along with methods to improve their proficiency, such as education, mentoring and rotational assignments			
Accomplishments/Planned Programs Subtotals	-	5.000	4.760

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Develop and extend fundamental knowledge, advanced methods, processes and tools and cutting edge techniques for systems engineering of complex designs of relevance to the DoD mission.

• Promulgation of advanced System Engineering approaches through research publications, presentations and monographs.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P402 / *Systems Engineering Research Center*

• Adoption of SERC methods, processes, and tools into DoD component activities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / *Engineering Science and Technology (S&T)*	Project (Number/Name) P403 / *Engineered Resilient Systems*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P403: *Engineered Resilient Systems*	0.000	0.000	10.000	9.741	-	9.741	9.946	10.000	9.949	4.960	Continuing	Continuing

A. Mission Description and Budget Item Justification

Engineered Resilient Systems will improve design agility and cost-effectiveness during analysis and development leading to improvements in testing, manufacturing, and fielding of mission-effective and adaptable systems. Its products are engineering design visualization and tool integration frameworks that will integrate physics-based models and engineering tools across acquisition disciplines to vastly improve the ability to perform tradespace and requirements analysis, iteratively optimize designs and improve architectures to reduce or eliminate sensitivity to adversary tactics and capability improvements, and adapt those designs over time. Its goal is to achieve a vitally-needed transformation in the contribution of Defense systems engineering to design resilience and effectiveness across the systems lifecycle. These engineering improvements are essential to address a geopolitical environment marked by rapidly changing threats, tactics, missions and technologies, and fiscal constraints. The pace of change renders current point-design approaches unsustainable in both cost and time.

ERS research and development focuses on new concepts for implementing an integrated suite of modern computational engineering tools, models, simulations and related capabilities, and tradespace assessment and visualization tools within an architecture aligned with acquisition and operational business processes. These integrated tools will operate within a framework that supports data-driven decision-making in an innovative environment that provides advanced knowledge management, including data retention and lessons-learned, and enables multi-community collaboration. ERS leverages multi-fidelity physics-based models developed by the S&T community to inform the acquisition decision process (e.g., increased/easier utilization of High Performance Computing, web-based analysis with large data sets, and lifecycle cost sensitivity analysis). These new computational and model-based frameworks adapt advanced design and modeling approaches from Government, industry, and academia to enable our Nation to affordably deliver warfighting capability.

This effort continues execution of the ERS efforts previously funded in PE 0602251D8Z, Applied Research for the Advancement of S&T Priorities and builds upon earlier initial work for the purpose of achieving the goals set forth in the ERS DoD Community of Interest Roadmap. It is also fully coordinated and aligned with the work in Army PE 0603734A, Military Engineering Advanced Technology (Project T08).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Engineered Resilient Systems (ERS)	-	10.000	9.741
Description: ERS research and development focuses on new concepts for implementing an integrated suite of modern computational engineering tools, models, simulations and related capabilities, and tradespace assessment and visualization tools within an architecture aligned with acquisition and operational business processes. These integrated tools will operate within a framework that supports data-driven decision-making in an innovative environment that provides advanced knowledge management, including data retention and lessons-learned, and enables multi-community collaboration. ERS leverages multi-fidelity physics-based models developed by the S&T community to inform the acquisition decision process (e.g., increased/easier			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P403 / *Engineered Resilient Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
utilization of High Performance Computing, web-based analysis with large data sets, and lifecycle cost sensitivity analysis). These new computational and model-based frameworks adapt advanced design and modeling approaches from Government, industry, and academia to enable our Nation to affordably deliver warfighting capability. ***FY 2016 Plans:*** Conceptual, Computational, and World-wide Environmental Representation. Implement surface water and watershed modeling capability to represent effects of hydrological impacts on systems of interest. Translate and utilize National Geospatial Intelligence Agency Geospatial Information System (GIS) data and common data production standards sponsored by the Modeling and Simulation Management (MSM) Office to build synthetic computational environments. This effort will be expanded to additional domains of the environment further in the development term. Mission-Relevant Engineering Tradespace Analysis. Develop next-generation tradespace tools that allow generation of multitudes of designs with many design parameters; within this data-rich space, analytically examine trades in design parameters and system performance across a range of military missions; provide means to visualize results in order to efficiently identify promising designs and key parameters; and incorporate lifecycle cost. Utilize High Performance Computing (HPC) capability for physics-based modeling of system performance with initial focus on select systems, such as ship platforms. Collaborative Engineering Analysis and Engineering Decision Making. Demonstrate and analyze conceptual workflow methods using open standards to link mission-relevant tradespaces and systems engineering tools with operational simulations. Design and implement initial knowledge management environment for information sharing across DoD networks in preparation for service, agency, and industry use. Capability Integration and Demonstration. Conduct a series of focused evaluations across the services, academia, and industry to integrate components of synthetic environments, high-fidelity computational models, and tradespace analysis tools into the ERS architecture. Integrate and demonstrate tools with acquisition community partners. Identify lessons learned and improve the associated workflows and ERS components. ***FY 2017 Plans:*** Conceptual, Computational, and World-wide Environmental Representation. Develop simulations of wave dynamics under varying physical and relative conditions; apply physics to analysis, integration and testing of NGA, Air Force, Navy, and Army environmental data sets. Extend mission context analysis and evaluation to multiple environmental simulations. Test and integrate automatic computational scenario development with simulation parameter settings. Provide workflow management with user-selected model-based simulations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603833D8Z / *Engineering Science and Technology (S&T)*	**Project (Number/Name)** P403 / *Engineered Resilient Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Mission-Relevant Engineering Tradespace Analysis. Design and test primary framework for ERS next-generation tradespace analysis tools providing user-requirements in data package management, statistical analysis, automated data storage and advanced visualization; Implement and test sub-system analysis in trades; Design and test user interfaces; Design integration of tradespace analytics with ERS open system in mapping to acquisition users requirements and Defense Acquisition processes; apply tradespace capability to fixed-wing manned/unmanned, ground vehicle, and modular ship design project demonstrations. Capability Integration and Demonstration. Enrich and extend open architecture design by collecting and integrating DoD acquisition and industry user requirements, implemented in an initial, open system model for feedback, evaluation, and enhancements. Design and evaluate information assurance security architecture, vulnerability analysis, and integrate intellectual property management capability. Map advanced ERS tools and capabilities to Defense acquisition processes and fully integrate distributed, lifecycle cost models. Collaborative Engineering Analysis and Engineering Decision-making. Develop robust methods to protect industry intellectual property and provide lessons-learned repository for creating and collaborating between DoD research & development, DoD acquisition, and industry partners. Provide mature knowledge management environment for tradespace analysis using facilities at the Defense Technical Information Center.			
Accomplishments/Planned Programs Subtotals	-	10.000	9.741

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Development of a technological capability for DoD Science and Technology, academia, industry, and the requirements/acquisition communities to collaborate and provide an innovative and more effective means for engineering.
- Demonstration and evaluation of next-generation engineering methods and design tools, documented in analyses and technical reports.
- Use of Engineered Resilient Systems engineering methods and design tools.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/Science and Technology*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	261.981	79.073	91.425	87.135	-	87.135	89.586	97.056	98.323	100.276	Continuing	Continuing
1: *High Speed Systems Test*	53.610	23.105	25.419	16.903	-	16.903	12.544	13.900	14.112	14.238	Continuing	Continuing
2: *Spectrum Efficient Technology*	25.371	5.612	7.572	8.458	-	8.458	9.633	10.306	10.486	10.689	Continuing	Continuing
3: *Electronic Warfare Test*	49.309	7.540	10.432	12.003	-	12.003	12.947	14.310	14.129	14.410	Continuing	Continuing
4: *Advanced Instrumentation Systems Technology*	30.381	12.071	12.886	10.876	-	10.876	11.919	12.408	12.641	12.908	Continuing	Continuing
5: *Directed Energy Test*	30.762	5.805	6.526	7.350	-	7.350	8.236	8.548	8.696	8.865	Continuing	Continuing
6: *C4I & Software Intensive Systems Test*	51.866	14.448	15.328	13.384	-	13.384	12.722	10.774	10.941	11.160	Continuing	Continuing
7: *Unmanned and Autonomous System Test*	14.021	5.239	6.686	8.819	-	8.819	9.888	12.697	12.980	13.408	Continuing	Continuing
8: *Cyberspace Test*	6.661	5.253	6.576	9.342	-	9.342	11.697	14.113	14.338	14.598	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Test and Evaluation/Science and Technology (T&E/S&T) Program seeks out and develops test technologies to stay in pace with evolving weapons technologies. This program is critical to ensure that the Department of Defense (DoD) has the ability to adequately test the advanced systems that will be fielded in the future. To meet this objective, the T&E/S&T Program performs the following activities:

- Exploits new technologies and processes to meet important test and evaluation (T&E) requirements.
- Expedites the transition of new technologies from the laboratory environment to the T&E community.
- Leverages industry advances in equipment, modeling and simulation, and networking to support T&E.

Additionally, the T&E/S&T Program examines emerging T&E requirements resulting from Joint Service initiatives to identify T&E technology needs and develop a long-range roadmap for technology insertion. The program leverages and employs applicable applied research efforts from the highly developed technology base in DoD laboratories and test centers, other government agencies, and industry to accelerate development of new test capabilities. The program outreaches and engages academia to address test technology challenges in DoD testing, advancing Science, Technology, Engineering and Mathematics (STEM) initiatives at Historically Black Colleges and Universities (HBCU) and other minority serving institutions. This program provides travel funds for T&E/S&T program oversight, special studies, analyses, and strategic planning related to test capabilities and infrastructure. The T&E/S&T Program aligns with the S&T Communities of Interest (COI) to prepare the T&E community to test warfighting capabilities that emerge from priority S&T investments. The T&E/S&T Program is funded within the Advanced Technology Development Budget Activity because it develops and demonstrates high payoff technologies for current and future DoD test capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603941D8Z *I Test and Evaluation/Science and Technology*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	81.033	82.589	85.514	-	85.514
Current President's Budget	79.073	91.425	87.135	-	87.135
Total Adjustments	-1.960	8.836	1.621	-	1.621
• Congressional General Reductions	-	-0.164			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	9.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.032	-			
• SBIR/STTR Transfer	-1.928	-			
• Internal Adjustment	-	-	2.249	-	2.249
• Economic Assumption Reduction	-	-	-0.628	-	-0.628

Change Summary Explanation

• Efficiency Savings: Fiscal Guidance of baseline program adjusted to realign funds for higher priorities within DoD and to achieve departmental efficiencies.
• Economic Assumption Reduction

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 1 / *High Speed Systems Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
1: *High Speed Systems Test*	53.610	23.105	25.419	16.903	-	16.903	12.544	13.900	14.112	14.238	Continuing	Continuing

A. Mission Description and Budget Item Justification

High-speed/hypersonic weapons are being developed to ensure the continued military superiority and strike capability of the United States including freedom of movement and freedom of action in areas protected by anti-access/area denial defenses. Current weapon system demonstrations and technology development programs include high-speed and hypersonic air-breathing missiles, maneuvering reentry and boost-glide weapons, hypersonic gun-launched projectiles, and air-breathing space access vehicles. These systems require development of conventional and high-speed turbine, ramjet, scramjet, and combined cycle engines; high temperature materials; thermal protection systems (TPS); and thermal management systems.

The High Speed Systems Test (HSST) project addresses test technology needs including propulsion, aerodynamic and aerothermal testing, so the test community has the technology to support the required test scenarios for concepts under development in the science and technology (S&T) community. The technology developments within the HSST project align with the Department of Defense (DoD) S&T priority investments. As such, the HSST project is developing, validating and transitioning advanced test and evaluation (T&E) technologies for ground test, open-air range flight test, and advanced computational tools, along with instrumentation and diagnostics systems for use in both ground tests and flight tests of high speed systems.

The HSST project develops technologies to enable robust, accurate, and timely T&E of these future weapon systems. DoD acquisition regulations require weapon systems to undergo a thorough T&E process to detect deficiencies early and to ensure system suitability and survivability. However, the extreme environments in which these weapons operate preclude accurate determination of their performance and operability with today's T&E assets. Current national test capabilities have deficiencies in data accuracy, flight condition replication and simulation, test methods, productivity, modeling and simulation (M&S) fidelity, and range safety.

The HSST mission is to address these national test capability gaps by providing test technology solutions that will enable high-speed and hypersonic weapon systems to be successfully developed through accurate, robust, and efficient T&E.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: High Speed Systems Test	23.105	25.419	16.903
FY 2015 Accomplishments: The HSST project continued to advance ground and flight test technologies, techniques, instrumentation, and modeling and simulation capabilities required for the development of high speed air-breathing propulsion and boost-glide weapons. Progress was made toward addressing the two most significant technology shortfalls in current hypersonic aero propulsion ground test capabilities: clean air heat addition (i.e. non-vitiated air) and variable Mach number test capability. Current production ground test facilities create the high temperature propulsion system inlet conditions necessary for air-breathing scramjet engine testing by burning fuel in the facility airflow supplied to the engine inlet for operation. As demonstrated by an HSST FY 2011 test, the resulting vitiated air has different gas properties than clean air found in the atmosphere and thus is not representative of what the vehicle would experience during flight. This significantly affects the engine's performance and operability in the test environment resulting in erroneous flight performance predictions. Variable Mach number capability is required to "fly the mission"			

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Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 1 / *High Speed Systems Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and determine the critical transient operability effects throughout the flight envelope. Incorporation of component technologies, previously developed by the T&E/S&T program, were initiated into a small-scale, clean air, true temperature, and variable Mach number (M4.5-7.5) aero propulsion test facility, called the Hypersonic Aeropropulsion Clean Air Testbed (HAPCAT). Completion of this facility will demonstrate that component technologies have reached Technology Readiness Level (TRL) 6, provide an on-going test asset to the DoD, and reduce risk for construction of a full-scale facility. Phase I of the facility development completed, including successful demonstrations of the capability of the clean air regenerative storage heater ability to conduct aeropropulsion and aerothermal tests in the future. During these demonstrations, all associated support systems, instrumentation, and controls required for facility operation functioned appropriately. Design efforts for the immediate follow-on phase neared completion, including the critical design of the air delivery system. Another FY 2015 effort examined the incorporation of advanced morphing ceramic components for hypersonic ground test facilities into the design of common facility nozzle and ducting hardware. This effort was conducted to achieve a variable Mach number capability and variable inlet distortion patterns representative of flight-like inlet systems. Test planning activities to validate direct-connect hardware designs were completed with testing to take place at the Air Force Research Lab (AFRL). This technology promises to provide a significant advantage over current rigid, stationary facility hardware by providing a “first-ever” realistic variable Mach flight distortion simulation test capability, while reducing costs and increasing productivity. Large-scale scramjet engine test techniques accomplishments included continued progress in determining the capability of existing ground test facilities and methodologies to evaluate and develop large-scale hypersonic propulsion systems. Testing of the semi-freejet test configuration utilizing an advanced hydrocarbon fueled missile scale scramjet continued. Semi-freejet thrust stand improvement options were assessed to improve data quality for comparison to freejet test results. Upon completion of the final semi-freejet test phase of the project, the resulting analysis comparing tests between the larger and smaller facilities will allow the optimized utilization of existing facilities and define the size and type of investments needed for future large-scale scramjet vehicle development and reduction of flight test and acquisition risks. Efforts to extend the Large Energy National Shock Tunnel II were initiated. The resulting additional capability will allow longer duration testing of hypersonic vehicles. Such testing will enable the full development of complex flow features affecting vehicle performance, the determination of control surface responsiveness and effectiveness, and the evaluation of the performance of aerodynamic features. The improvements will help fill a critical test capability gap and support future hypersonic vehicle programs. Designs for the extended facility were completed and approved, and long-lead items were delivered. The HSST project initiated the aerothermal test technology development of a Mid-Pressure Arc Heater Prototype. The prototype will upgrade an existing Huels arc heater with a segmented heater, creating a test envelope approximately three times larger than the current envelope. The prototype will provide extended test run time of up to 30 minutes, and a higher thermal load, representative of those experienced by a hypersonic vehicle TPS. Initial system design and component acquisition began, including the upgrade of the power and cooling support systems. A facility checkout matrix was defined to confirm that the various upgrades function as expected. The completed prototype will enable better evaluation of the performance of TPS materials, seeker windows, and other vehicle features subjected to high thermal loads. In a related effort, the arc heater flow quality			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
aerothermal test technology development made significant progress toward independently-powered spin-coil technologies to control the physical characteristics of the spinning arc column and its attachment location and arc duration on electrode surfaces within the arc heater. This effort will improve the service life of the electrodes and improve hypersonic nozzle flow quality. Computational and numerical simulation models of magnetic field and arc column interactions with the air flow of an arc heater were developed as part of an arc rotation prediction database. The HSST project continued research in FY15 that will provide better prediction and determination of boundary layer growth and transition effects upon hypersonic vehicle performance. Understanding and predicting boundary layer transition (BLT) represents a critical shortfall in the hypersonic community, as it affects the thermal loads, stability and control, and overall performance of a vehicle. Multiple test articles representing different flight vehicle shapes were defined for use in the research, and primary test parameters were identified. Using this information, test plans were developed for various wind tunnel entries to study critical parameters affecting boundary layer stability and transition. Experimental results acquired through the BLT effort will be used to validate state of the art prediction tools and measurements of BLT mechanisms. Progress continued toward the development of a ground based, portable high altitude light detection and ranging (LIDAR) system to measure atmospheric conditions (density, temperature, pressure, wind speed/direction, oxygen and water content) along a hypersonic vehicle's flight path. This technology is a significant advancement over current technologies, improving the accuracy of determining high altitude atmospheric conditions. This atmospheric data is needed to assess the performance and operability of air-breathing missiles and boost-glide vehicles during development. An effort was initiated to evaluate the feasibility of using Un-crewed Aerial System (UAS) platforms to support hypersonic flight test. Telemetry, optical remote sensing, and instrumentation for LIDAR atmospheric measurements were analyzed to estimate the technical performance of each on a UAS platform. This effort will also determine the Concept of Operations (CONOPS) for a High Altitude, Long Endurance (HALE) UAS configured to support flight test of hypersonic vehicles. Lessons learned from the development of a real gas force measurement balance system were used to begin the design of an advanced version of the balance system with optimal load cell and accelerometer placement. The advanced balance will enable force and moment measurements in a one to two millisecond timeframe. Significant progress was made with non-intrusive flow measurement systems as well. Work to validate an optical measurement instrument utilizing mid-wave infrared (MWIR) spectral absorption to obtain scramjet exhaust gas temperature and chemical species was conducted in realistic, high-noise test facility environments. Checkout of a high temperature shear stress sensor was successfully conducted, and a full uncertainty analysis was performed using test data. The sensor was installed into a scramjet engine for additional operational testing. Work on the MWIR thermal imaging technique continued with using the technology to support a hypersonic glide vehicle test program. This technique will permit quantitative thermal imaging of hypersonic model surface flow for high enthalpies without the obscuring flow field emissivity effects that can shroud surface temperature imaging. Advances were achieved in the development of M&S tools. Beta testing by a broad spectrum of hypersonic community professionals was completed for the STABL-3D advanced three-dimensional boundary layer stability and transition analysis code. Predictions from the code compared very well with experimental data. The code enabled prediction and analysis of the			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
characteristics and extent of boundary layer transition on the test article surface resulting from variations in nose bluntness, unit Reynolds number, and angle of attack. A hypersonic nozzle characteristics based grid generation code with a graphical user interface was completed and used to support the design of a hypersonic tunnel nozzle. Development continued on the improved Computed Tomography Method (CTM) algorithm capable of constructing more complex flow field patterns for optical absorption measurements of turbine and scramjet engine exhaust gas properties. Processing time for the CTM algorithm was reduced and the resolution of the two-dimensional spatial maps was improved. A transient thermal analysis software toolset was developed to support T&E of a hypersonic vehicle's TPS aerothermal and ablation response to high speed, high temperature flow in ground and flight test environments.			
FY 2016 Plans: New test technology efforts will be initiated addressing: test technologies, techniques, and methodologies to determine full-scale propulsion system performance and operability from subscale tests. New test technology efforts will additionally address technology for improved characterization of TPS ablation and weather effects and further development of M&S codes for accurate prediction of flow fields, boundary layer transition, and heat transfer in high-speed flow. Efforts will be initiated to develop new and more accurate instrumentation systems and advanced test technologies to meet needs in gas turbine engine and electromagnetic railgun testing. The HAPCAT project will continue to develop and demonstrate air delivery system technologies to provide uniform flow with variable pressure and temperature from multiple air sources through a nozzle up to Mach 7.5 conditions. The project activities will include initiation of Phase 2 to begin fabrication of the air delivery system and design of the variable Mach nozzle. Direct-connect hardware validation testing of a ceramic morphing direct connect facility nozzle and distortion generator suitable for missile-scale high speed ground test facilities will be completed. This effort will aid in demonstrating the ability to maintain well-conditioned flow while continuously varying the flight Mach number and inlet distortion levels. Upon completion of the Large Energy National Shock Tunnel II extension, facility performance of the tunnel will be evaluated to verify extended run times. A helium recovery system will also be implemented to enable the reuse of helium in the facility, reducing the cost of testing. Heater segments for the segmented Mid-Pressure Arc Heater Prototype will be developed, and operation of the segmented arc heater system will be validated. Improved arc jet facility spin coil power controls will be fabricated, and the spin coil system will be demonstrated proceeding toward the goal of improved T&E of maneuvering reentry and boost/glide vehicles. The BLT project will conduct testing in multiple tunnel facilities to provide a basis for comparative analysis in different test configurations, and to provide comprehensive code validation test cases regarding 3D boundary layer stability and transition. Testing and demonstration of high altitude LIDAR atmospheric sensing will be completed and the portable system will be transitioned to support test programs at multiple flight test ranges. Development of an airborne version of the LIDAR sensor will begin. A more advanced real gas force measurement balance system will be developed for use on a flight-representative model. The balance system will be calibrated, and a full uncertainty analysis will be performed. Optimization of the MWIR thermal imaging			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
signal-to-noise ratio as a function of test enthalpy technique will be completed. Measurements of thermal emissions from the surface of typical boost-glide vehicles in an impulse test facility will be conducted to evaluate the effectiveness of different surface compositions and treatments and selected filter frequencies for thermal imaging. Verification and improvement of computational fluid dynamics (CFD) codes will continue, making use of the unique data sets obtained from the HSST scramjet engines tests and BLT experiments described above. A validated STABL-3D boundary layer transition prediction tool will be released allowing for application to complex, 3D boost-glide vehicle geometries. The transient thermal analysis software effort will complete integration of an aerothermal code and a structural heating code which will be demonstrated on a flight-representative geometry. The UAS based range effort will continue to assess the technical performance and CONOPS for a HALE UAS configured to support flight T&E of hypersonic vehicles. Efforts will focus on the development and integration of an airborne telemetry system onboard a UAS capable of collecting data from a hypersonic flight vehicle over the ocean areas. ***FY 2017 Plans:*** FY 2017 will see continued efforts to improve hypersonic ground and flight test capabilities to levels required for acquisition programs. Efforts will include demonstration of new flight test techniques, improvements in instrumentation, and continued improvement and validation of CFD codes. Progress will continue toward final integration and operation of the HAPCAT clean-air, variable Mach number aeropropulsion test facility, including completion of the variable Mach number nozzle design and preparations to demonstrate the capability to simultaneously vary stagnation pressure, temperature and Mach number from 4.5-7.5. The upgrades to the mid-pressure arc heater will be completed, enabling more representative thermal loads to be simulated during hypersonic testing. The MWIR thermal imaging project will establish the necessary technique and equipment required to perform thermal imaging of models in high-temperature, high-emissivity flows. Completion of BLT efforts will establish a new baseline protocol and recommendations for hypersonic aero performance predictions utilizing testing and M&S.			
Accomplishments/Planned Programs Subtotals	23.105	25.419	16.903

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 2 / *Spectrum Efficient Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
2: *Spectrum Efficient Technology*	25.371	5.612	7.572	8.458	-	8.458	9.633	10.306	10.486	10.689	Continuing	Continuing

A. Mission Description and Budget Item Justification

Weapon systems have become increasingly complex in recent years, resulting in the need for significantly more data to be passed among these systems as well as between the systems and our test infrastructure. A vast amount of data must be collected, transmitted, and analyzed, which requires a large amount of radio frequency (RF) spectrum resources. However, the amount of RF spectrum designated to support test and evaluation (T&E) is decreasing, most notably due to reallocation of spectrum for commercial use. The combination of decreasing RF spectrum and increasing data requirements results in an urgent need to develop test technologies that maximize the use of spectrum resources for Department of Defense (DoD) T&E operations.

The L and S frequency bands are the traditional spectrum allotted for military T&E use. The explosive need for spectrum in the commercial sector has resulted in reallocation of portions of these bands to industry. To compensate, DoD is now authorized to use the C-Band spectrum which offers numerous benefits, including a three-fold increase in available bandwidth, but C-Band comes with technical challenges and regulatory constraints. Most notably, our current test infrastructure for telemetry is not designed to accommodate C-Band. Technologies are required to implement innovative techniques that efficiently facilitate our use of C-Band without a major overhaul to our national test infrastructure. For instance, commercial telemetry transmitters operate in C-Band but do not have the form factor (size and weight) nor ruggedized packaging to survive airborne test applications.

Traditional telemetry applications employ streaming telemetry where data is moved one-way from the instrumented system under test to our test range infrastructure. Modern network based telemetry capabilities enable more robust, efficient bidirectional transfer of data. DoD's strategy is to create technologies for implementing a telemetry capability in C-Band, using the legacy L- and S-Bands for both streaming and networked telemetry, and researching the feasibility of using higher frequency bands to augment telemetry operations.

The Spectrum Efficient Technology (SET) project is developing test technologies that enable more efficient use of legacy telemetry bands and expansion into non-traditional areas of the RF and optical spectra at DoD test ranges. The technology development efforts within the SET project have been prioritized to align with Department of Defense guidance on science and technology priority investments. As such, the SET project is focusing on growing data requirements of warfighting systems and the limited availability of spectrum for testing. The SET project is structured to develop test technologies to advance range communications, networked telemetry capabilities, and enhanced management of spectrum at DoD test ranges.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Spectrum Efficient Technology	5.612	7.572	8.458
FY 2015 Accomplishments: The SET project developed technologies to meet networked telemetry requirements and performed risk reduction for Central Test and Evaluation Investment Program (CTEIP) networked telemetry projects. A networked data recorder was developed to provide risk reduction in support of CTEIP developments and subsequently tested in the CTEIP networked telemetry integration laboratory. The networked data recorder was transitioned to address test range requirements for data recording and selectable parametric extraction from the recorder during developmental flight testing at the Air Force Test Center (AFTC), Edwards			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
AFB, CA. Development of a prototype non-blocking Ethernet switch for airborne platforms was demonstrated to support the deployment of a networked telemetry system. This technology will serve as the network backbone which will tie all onboard instrumentation together with the onboard test data transmitter. Technology enabling the real-time dynamic reconfiguration of transmitted test data over a telemetry network was further matured. Development of a multi-band transceiver operating in the L/ S/C-Band spectrum employing multiple advanced waveforms continued and key components including the transceiver multi-band RF front end were matured. Development of a telemetry transceiver capable of dynamically reconfiguring the data modulation scheme based on telemetry link conditions continued. Technology enabling more efficient handling of multiple priority test data and communications between the network router and telemetry transceiver was matured. The SET project developed technologies to address over-the-horizon telemetry requirements and performed risk reduction for a CTEIP telemetry improvement project supporting testing of large footprint weapons, such as long range missiles. An L/S/C-Band phased array antenna suitable for mounting on an aircraft was completed, demonstrated, and transitioned to support the development of a Navy range support aircraft to replace the legacy range aircraft. Development continued on modular digital beam-forming technologies to control a phased array antenna and track multiple targets simultaneously. This technology will significantly reduce the system complexity for an airborne phased array antenna, providing savings in terms of size, weight, power consumption, and airframe modifications on the test platform. The SET project investigated techniques to expand telemetry operations into non-traditional spectrum bands by characterizing multipath effects in a range of terrestrial and atmospheric environments. A technical investigation into the telemetry link performance of the C-Band versus S-Band spectrum for a missile test mission was completed and the performance results transitioned to the test ranges. The C-Band telemetry antenna technology developed under this effort was initially transitioned to Naval Air Warfare Center – Weapons Division at China Lake, CA and Pt. Mugu, CA; however, the technology is extensible, enabling its widespread use across the Major Range and Test Facility Base. Additionally, this antenna technology was used to support technical investigation of C-Band versus S-Band link performance at White Sands Missile Range, NM. The SET project completed the development of a three dimensional channel model tool for modeling and simulation of telemetry channels in various environments. This tool provides higher fidelity simulations for use in researching the effects of terrain, environments, and various other factors on telemetry channels. This tool was transitioned to the AFTC to support pretest analysis of mission flight profiles. Additionally, SET completed several technical investigations to expand telemetry operations into non-traditional spectrum bands. SET initiated an effort to investigate the use of the higher frequency Ka-Band and Ku-Band for telemetry links. This investigation determined the performance characteristics of the bands, determined the ideal operating frequencies for telemetry purposes, and identified technology gaps and components required to implement a robust telemetry capability. The SET project completed a technical investigation exploring the use of directional free space optical links for telemetry purposes, and identifying potential scenarios where optical telemetry links can be used to augment traditional RF telemetry links.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The SET project will further advance development of technologies required for network telemetry. Efforts to develop a multiband L/S/C-Band transceiver will continue. Technology enabling more efficient handling of priority test data and communication between the network router and telemetry transceiver will continue. Development of a telemetry transceiver capable of dynamically reconfiguring the data modulation scheme based on telemetry link conditions will continue. An effort to develop digital beam forming and steering technologies for an airborne phased array antenna will be completed, tested, and transitioned to CTEIP to support the development of an over-the-horizon telemetry capability. Additionally, SET will initiate efforts to develop phased array technology for use on the ground. The high directionality of phased array antenna technologies will enable spectrum spatial reuse techniques for more effective spectrum scheduling. The SET project will initiate an effort to develop a telemetry transmitter capable of operating in the 5925-6700 MHz, “Upper C-Band”. This portion of the RF spectrum is highly fragmented, typically in 1-2 MHz portions due to incumbent users such as satellite uplinks. This effort will leverage existing commercial technologies, such as Long Term Evolution-Advanced (LTE-A), a type of wireless technology that has taken hold throughout North America and is fast becoming a global standard. LTE-A will sum the interstitial portions of spectrum to form an aeronautical telemetry channel, which is typically 20 MHz in bandwidth. This technology will enable RF spectrum scheduling flexibility, expand telemetry operations in the C-Band, and increase the number of test missions a range can simultaneously support. ***FY 2017 Plans:*** The SET project will initiate development of radio technology that can utilize alternate spectrum in the upper frequency bands. These efforts will determine the feasibility of using the upper bands for use in telemetry. Efforts to develop phased array technology for use on the ground will be further matured. Technologies to sum non-contiguous RF spectrum in the upper C-Band will be matured. A telemetry transceiver capable of reconfiguring the data modulation scheme based on telemetry link conditions will be completed, demonstrated, and transitioned to support networked telemetry requirements. Efforts to develop spectrum management tools to optimize the use of available RF spectrum will continue. Additionally, the SET project will complete work to mature technologies in optimization and management of the telemetry networks through spectrum management tools.			
Accomplishments/Planned Programs Subtotals	5.612	7.572	8.458

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 3 / *Electronic Warfare Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3: *Electronic Warfare Test*	49.309	7.540	10.432	12.003	-	12.003	12.947	14.310	14.129	14.410	Continuing	Continuing

A. Mission Description and Budget Item Justification

In order to establish dominance in the modern battlespace, our offensive and defensive electronic warfare systems must be capable against advanced radio frequency (RF) directed threats and electro-optic (EO) guided threats, which include infrared (IR) guidance. Ensured dominance in these areas requires more robust test and evaluation (T&E) with technologies that are rapidly adaptable to changing threats.

Readily available, IR seeking, man-portable air defense systems (MANPADS) are difficult to detect and pose an imminent and lethal threat to military aircraft of all types. Our ability to counter such threats is essential to owning the battlespace in theater. Therefore, the ability to test missile warning systems (MWS), hostile fire indicator (HFI) systems, IR countermeasures (IRCM), and advanced threat sensors is critical to our national defense. Additionally, a new generation of enemy RF missile seekers is both currently fielded and in further development, requiring a correspondingly new generation of test technologies to test the latest countermeasures. The T&E community is required to test IRCM and RF countermeasure systems in a repeatable manner with ground-truth data before and after integration into warfighting systems. Without new test technologies, the Department of Defense (DoD) will be unable to perform adequate T&E of advanced warning and countermeasure systems.

The technology development efforts within the Electronic Warfare Test (EWT) project have been prioritized to align with DoD guidance on science and technology priority investments. As such, the EWT project is focusing on the test needs in both the EO, including IR, and the RF threat domains. Additionally, development of core test technologies in this area can be leveraged to meet other EO and RF test requirements, such as in fire control systems; intelligence, surveillance and reconnaissance (ISR) sensors, and weapon seekers.

The EWT project develops test technologies to stimulate IRCM and RF system sensors through the high-fidelity simulation of scenes viewed by the sensors. Stimulation can be as simple as testing to see if a system under test responds to an image or as complex as simulating complex battle space phenomena to measure the response of a system under test in a more relevant, cluttered scenario. Simulations and stimulations are used at open air ranges and in installed system test facilities (ISTF), and in hardware-in-the-loop (HWIL) test beds.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Electronic Warfare Test	7.540	10.432	12.003
FY 2015 Accomplishments: The EWT project continued efforts to develop a wide field of view (WFOV) infrared scene projector interface by using a dynamic IR optical coupler. The scene projector will be used for testing IRCM systems. Dynamic and static testing and signature collection was completed for the boost sustained motor of a surrogate missile system used for testing MANPADS IRCM systems. The EWT project continued development of a wideband multi-beam klystron to be used as a simulator for next-generation surface-to-air-missile systems. EWT developed and tested control hardware for a system to generate virtual radar targets using digital RF memory (DRFM) technology. Additionally, EWT continued development of a prototype real-time air-to-surface radar stimulator for testing of synthetic aperture radar surveillance, automatic target recognition, and bomb damage assessment modes. The EWT project continued an effort to develop a technology to produce high-fidelity electronic counter-countermeasures (ECCM) radar			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
signal processing techniques that employ sophisticated waveforms with algorithms, such as adaptive filtering. The technology will improve testing against modern RF surface-to-air missile threats. EWT demonstrated a high temperature infrared scene projector that operates over the entire mid-wave infrared (MWIR) band. ***FY 2016 Plans:*** The EWT project will complete efforts to develop an IR scene projector using digital micromirrors with long wave IR and MWIR channels. EWT will complete efforts to develop a system for testing directed IRCM (DIRCM) systems in a high clutter environment; the system will additionally be used in common IRCM (CIRCM) testing. EWT will complete and demonstrate a two-color IR scene projector to test two-color, high spatial resolution MWIR sensors. Work on multi-static radar trackers for testing of HFI systems will complete with demonstration of this technology. Additionally, EWT will demonstrate a prototype of a reconfigurable threat signal processor allowing rapid configuration of threat radar test simulators. EWT will continue developing a wideband multi-beam klystron transmitter for high fidelity threat simulation of next generation RF surface-to-air missiles, completing the electron gun fabrication and the output cavity design, and demonstrating a laboratory breadboard system. Development of DRFM algorithms for generation of virtual radar targets will continue with completion of bench testing of hardware and software. Work will continue on using DRFMs to enable chamber testing of operational communications data between aircraft. An air-to-surface radar imaging stimulator will be demonstrated. A prototype MWIR scene projector with apparent temperatures in excess of 1500K will complete as well as a 1kHz, two-color scene generator. EWT will demonstrate a prototype wideband multi-beam klystron transmitter for high fidelity threat simulation of next generation RF surface-to-air missile radars. The EWT project will complete development of DRFM algorithms with bench testing of hardware and software for generation of virtual radar targets. EWT will complete development efforts using DRFMs to enable chamber testing of operational communications data between aircraft. ***FY 2017 Plans:*** The EWT project will invest in new technologies related to improving the electronic warfare T&E infrastructure. These new technologies will address the test infrastructure requirements to measure emerging weapon sensors and seekers, as well as to assess the performance of next generation IRCM and EW systems.			
Accomplishments/Planned Programs Subtotals	7.540	10.432	12.003

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 4 / *Advanced Instrumentation Systems Technology*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
4: *Advanced Instrumentation Systems Technology*	30.381	12.071	12.886	10.876	-	10.876	11.919	12.408	12.641	12.908	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Instrumentation Systems Technology (AIST) project addresses the test technology gaps resulting from emerging weapon systems that need to be tested at Department of Defense (DoD) open air ranges, undersea ranges, installed systems test facilities, hardware-in-the-loop laboratories, and measurement test facilities. Instrumentation requirements for systems under test are increasing exponentially for new weapons systems. Vehicle-borne and warfighter-wearable instrumentation packages are required. This instrumentation is for sensing and collecting critical performance data; determining accurate time, space, position information (TSPI)and attitude information; interfacing with command and control data links; monitoring and reporting system-wide communications; recording human operator physical and cognitive performance; and storing and transmitting data.

The technology development efforts within the AIST project have been prioritized to align with DoD guidance on science and technology (S&T) communities of interest (COIs). The AIST project is focused on supporting technology developments for advanced TSPI instrumentation (especially with limited or no availability of the Global Positioning System (GPS)), advanced sensors, advanced energy and power systems for instrumentation, non-intrusive instrumentation, mitigating range encroachment issues, and measuring warfighter physical and cognitive performance.

The AIST project addresses requirements for miniaturized, non-intrusive instrumentation suites with increased survivability in harsh environments. Such instrumentation is an urgent need because minimal space is available to add instrumentation to new or existing weapon systems subsequent to their development; furthermore, additional weight and power from instrumentation can adversely affect weapon system signature and performance. Instrumentation for humans-in-the-loop, such as dismounted warfighters, must not adversely affect performance, induce artificiality in the test environment, nor create operational burden. New technologies can be exploited to integrate small, non-intrusive instrumentation into emerging platforms during design and development, and, in some cases, into existing platforms. This class of instrumentation will provide critical system performance data during test and continuous assessment throughout a system's lifecycle. Technology developed under AIST can also benefit training and combat missions by enabling a continual feedback loop between the developer, training staff, operators and commanders.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Instrumentation Systems Technology	12.071	12.886	10.876

FY 2015 Accomplishments:

A continued major thrust included the development of test technologies to support collection of TSPI on warfighter systems (manned and unmanned), particularly in GPS-denied or degraded environments, such as in urban canyons and tunnels. This challenging T&E need cannot be met by a single technology solution. As such, the AIST project is pursuing multiple solutions; some are competing and some are complementary.

Efforts to develop technology to test systems that operate in a GPS-denied environment included an inertial tracking system that employs boot-mounted sensors for dismounted warfighters. The tracking system demonstrated the ability to geolocate, with sub-meter accuracy, a dismounted warfighter conducting activities over two hours of free movement. The AIST project continued to

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 4 / *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
develop a system to measure warfighter enclosed location (GPS-denied environment) at sub-meter accuracies using ambient amplitude modulation (AM) signals from radio stations or low cost supplementary AM transmitters at DoD test ranges where AM signals may be sparse. AM signal propagation during day and night was evaluated at an urban training range; data was collected at a variety of urban range structures observing centimeter accuracy within a concrete and steel structure. Efforts completed to develop technology that provides a seamless transition between outdoor and indoor environments to accurately track systems under test using modified GPS receivers, relayed GPS signals, and multi-lateration. Other filters and other sensors e.g., an inertial measurement unit (IMU) integrated into the system can potentially provide an overall TSPI solution with sub-meter accuracies. Efforts continued to develop technology to measure projectile position and attitude (six degrees of freedom) of high-velocity, spinning projectiles (at accuracies that significantly exceed the system under test guidance system). This technology will provide continuous estimation of the state description of a projectile through the duration of projectile flight via accurate and rapid RF range observations between the projectile and ground-based components. In support of other instrumentation solutions, an electro-releasable attachment technology development effort was completed. This included investigation of new adhesive technologies that employ an electrically releasing foil patch to allow attachment of sensors to non-conductive, painted surfaces of aircraft and other combat vehicles. Such technology significantly reduces the time to restore the system under test to its operational configuration. Development of the foil patch focused on an improved operating temperature range and adhesion strength for environmental testing (e.g., resistance to lightning strike) and end-to-end field testing. Final test data analysis completed and transition to DoD test ranges is ongoing. The AIST project completed development of a fiber-optic instrumentation suite to integrate into test projectiles for measurement of magnetic field strength in the harsh environment of an electromagnetic railgun (EMRG). Full-up testing with three EMRG shots at the Naval Surface Warfare Center-Dahlgren Division (NSWCDD) was conducted, achieving a significant benchmark by successfully measuring, for the first time, magnetic field strengths in an EMRG-launched projectile at 15-20 kG forces. Additional tests were completed at higher energy levels. The AIST project completed the development of algorithms and methods for automated detection and classification of marine mammal vocalizations collected by ocean floor range sensors (e.g., hydrophones) to allow the Navy to conduct critical test and evaluation (T&E) events without adversely impacting marine mammal populations. Testing has been successfully conducted at undersea ranges. A baseline classifier for six marine mammal species is currently running real-time, range-wide at the Atlantic Undersea Test and Evaluation Center, Pacific Range Missile Facility, and the Southern California Offshore Range. Additional classifiers were developed or improved and integrated into marine mammal monitoring nodes and transitioned to the Navy's major undersea ranges. Follow-on work is underway to implement software tools to perform automated aggregation, post-processing and a graphical user interface of detection/classification data generated by the marine mammal classification algorithms; this process currently requires experienced analysts to reduce the data. To support the needs of test ranges that conduct arena testing for weapon systems, AIST continued developing technology that uses passive imaging to characterize munition warhead fragment size, velocity, and distribution. This technology will significantly reduce set-up times and data analysis costs of current warhead arena test techniques. Advanced tracking algorithms were			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 4 / *Advanced Instrumentation Systems Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

merged into a stereo tracker (Track3D) to derive dense, fragment field state vector estimates. Stereo imagery was collected during three live-fire arena test events; the 3-D visualization and track analysis software developed for the arena test data was demonstrated.

The AIST project continued to develop technology that accurately provides dynamic measurements of warfighter body posture, and head and weapon orientation using fiber optic shape sensing integrated into a body suit to be worn under the uniform. Initial testing of electronics performance indicates four orders of magnitude faster than anticipated. The functionality of the fiber sensor length, shape, and absolute and relative angular accuracy of the system was demonstrated and verified in the laboratory environment.

Development of technology to assess warfighter cognitive states continued, including development of an integrated dry electroencephalogram (EEG) and functional near infrared (fNIR) sensor system capable of simultaneous measurement of brain electrical activity and blood oxygen level; an unobtrusive headset for test subjects; mental workload assessment software; and verification of system functionality.

An effort continued to investigate means to mitigate the impacts of wind energy system interference on test range radars. AIST evaluated four mitigation approaches to minimize the effects of wind turbines with the goal of reducing their effects by 60-70dB. AIST initiated an effort to collect wind turbine data for use in further evaluating algorithms to mitigate the impact to range radars.

Efforts continued to assess and leverage microsystems technology under development at universities, the Defense Advanced Research Projects Agency (DARPA), and government laboratories. These efforts will provide significant advances to T&E of modern war fighting systems.

A new effort was started to develop technology that enables in-water vehicles to recognize their position relative to another platform in real time. This new capability will improve ship safety during tests and allow for more controlled two-body measurements. The AIST project developed hardware and software and successfully conducted preliminary testing at the Atlantic Undersea Test & Evaluation Center and planned additional tests. AIST began development of a model to assess potential impacts of Electromagnetic Interference (EMI) caused by power lines near DoD test ranges. Lastly, AIST began an effort to evaluate Body Armor Blunt Trauma using fiber optics to measure the dynamics of back face deformation of body armor at high repetition-rates.

FY 2016 Plans:

Major thrusts for FY 2016 include continuing efforts in advanced sensors, TSPI instrumentation, warfighter physical and cognitive assessment under various workloads and test range encroachment mitigation. Additionally, AIST will continue to pursue test technologies for non-intrusive, advanced data acquisition and transformation instrumentation that operates on reduced power along with the development of advanced power sources for test instrumentation.

The AIST project will complete development of a model to assess potential impacts of EMI caused by high voltage power lines near DoD test ranges; the development of an inertial tracking system with boot-mounted sensors for dismounted warfighters; the investigations and resulting recommendations to mitigate wind turbine effects on DoD test ranges; development of technology to

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
provide accurate, dynamic measurements to display posture, head orientation, and respective orientations of warfighters and their equipment; development of a projectile tracking system using accurate and rapid RF range observations between the projectile and ground components; and technology to achieve real-time undersea situational awareness of undersea vehicles relative to another. The AIST project will continue the development and testing of classifiers to identify specific sea mammals (e.g., various dolphin and whale species) found at undersea ranges and the automated processing and display of mammal detections; developing compressive sensing cameras to characterize blast fragments; the development of a tracking system using AM Band signals; and developing technology to evaluate Body Armor Blunt Trauma. ***FY 2017 Plans:*** The AIST project will initiate efforts to develop advanced TSPI technologies for non-intrusive applications using wireless systems and optical, infrared, and/or acoustic techniques. TSPI technologies will be further developed to support: data collection in GPS-denied environments, TSPI on high dynamic systems such as missiles and projectiles, Real Time Casualty Assessment and TSPI on non-cooperative undersea weapon systems. Advanced sensor initiatives for non-intrusive applications will include multimodal transducers, and self-registering/self-calibrating sensors. Sensing applications will include weapon system orientation, body armor blunt trauma evaluation, air launched stores separation, angle of incidence measurement, and non-destructive radiographic defect evaluation for warheads and other weapons structures. Advanced data transformation initiatives will develop technologies for adaptive computing, virtual/synthetic instrumentation, data compression, wireless on-board data transport and improved data storage density. Other areas of investigation will include advanced data management techniques and micro-miniaturization of electronic components for non-intrusive applications. AIST will continue to investigate technologies for mitigating range environmental encroachment issues such as electromagnetic and alternative energy interference with range tracking systems. Additional efforts will include human performance measurement and assessment, specifically human interaction with unmanned systems and the evaluation of the interaction of the warfighter and weapons/equipment and interactions between individual warfighters in team-based holistic assessments. The AIST project will complete technology to measure fragment characteristics from warhead testing; TSPI using distinctive near-field patterns from AM signals; and automated processing and displaying of marine mammal locations on DoD sea ranges.			
Accomplishments/Planned Programs Subtotals	12.071	12.886	10.876

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 5 / *Directed Energy Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
5: *Directed Energy Test*	30.762	5.805	6.526	7.350	-	7.350	8.236	8.548	8.696	8.865	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) is exploring the military utility, safety, and suitability of directed energy weapons. A robust test capability to assess directed energy weapons is essential to understanding their effectiveness and limitations, including determining their effectiveness in performing counter improvised explosive device (C-IED) operations. Such assessments will depend upon knowledge acquired through the test and evaluation (T&E) of directed energy technologies and testing of operational concepts. Directed energy weapon technologies, primarily consisting of high energy lasers (HEL) and high powered microwaves (HPM), are outpacing available test capabilities. Traditional test techniques for evaluating conventional munitions (with flight times ranging from seconds to minutes) are not sufficient for the T&E of directed energy weapons that place energy on target instantaneously. Consequently, new test technology solutions are needed to ensure that adequate developmental, live-fire, and operational test capabilities are available when directed energy programs are ready to test.

Directed energy system and component testing requires three principal assessments: (1) energy or power on target; (2) the effects on the target; and (3) the propagation of the directed energy to the target through the atmosphere. In addition, the vulnerabilities of DoD systems to directed energy threats are required to be characterized, such as those requirements captured in Military Standard (MIL-STD)-464C. Equally as important, current test capabilities do not provide the detailed data required to understand U.S. directed energy system performance and effects. The technology development efforts within the Directed Energy Test (DET) project have been prioritized to align with DoD guidance on science and technology priority investments. As such, the DET project is developing the technologies necessary for quantitative assessment of United States (U.S.) HEL and HPM performance, as well as the vulnerability of DoD weapon systems to enemy directed energy threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Directed Energy Test	5.805	6.526	7.350

FY 2015 Accomplishments:

The DET project completed development of target board sensors to assess HEL energy on large targets. Similar work on HEL energy sensors for small targets such as mortars and rockets continued under two parallel efforts, with initiation of testing subsystems and materials for HEL survivability.

The DET project completed development of a prototype adaptive optics system designed to be readily adaptable to telescopes at DoD test facilities. The test technology will allow improved imaging of an HEL spot on a remote target. Regarding HEL atmospheric propagation, development of a light detection and ranging system (LIDAR) to measure atmospheric profiles along a slant path adjacent to the HEL beam propagation path was completed. This technology simultaneously measures profiles for three parameters: optical turbulence, water vapor content, and aerosol attenuation. Measuring these profiles will enable understanding of how atmospheric effects distort HEL beam propagation. A maritime version of this technology continued with completion of a critical design review. Fabrication and assembly of subsystems was initiated.

The DET project completed development of electric and magnetic field sensors in support of electromagnetic railgun (EMRG) T&E with development of new techniques to reduce noise on these measurements; these techniques increased the quality

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 5 / *Directed Energy Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

of data obtained to benchmark railgun development codes. DET completed development of a prototype miniature differential current measurement system that measures the current at nodes in a target circuit, allowing analysis of HPM effects at the sub-component level. DET continued development of a proof-of-concept voltage probe with bandwidths up to 100 MHz, allowing non-intrusive voltage measurements in HPM engagements. These probes are also useful for C-IED applications. Maturation of the slab coupled optical sensors from lab devices to prototypes was completed and testing was conducted in a relevant environment.

The DET project completed design of an advanced radome that will allow more reliable operation of the White Sands Missile Range (WSMR) HPM Wide Band Threat Source over all five bands of operation, enabling more robust, cost effective testing of U.S. systems against HPM threats. Development of a compact hard tube vircator (CHTV) to cover two frequency bands of interest continued. The CHTV development will result in an HPM source for testing in-chamber HPM effects, which at certain frequencies, represents a gap in current MIL-STD-464C testing.
The DET project completed a study of options for technology replacement of the WSMR fast burst nuclear reactor for sources that simulate nuclear weapon prompt radiation output (neutron radiation) for survivability testing of U.S. systems. Development of an enhanced capacitor bank and tube prototype was initiated in support of an ultra-short neutron pulse test capability. The driver of this effort is to enable higher fluence to support nuclear vulnerability testing.

FY 2016 Plans:
Within the HEL area, efforts will focus on continuing technology developments for measuring energy on target and characterizing effects on small targets using onboard sensing. DET will continue efforts to characterize HEL beam propagation through the atmosphere including those in the maritime environment to support emerging needs of the Navy.
Initiatives to achieve very small, non-intrusive current and voltage sensors to measure HPM effects inside a target will be continued. A small, minimally intrusive data acquisition device with a wide bandwidth to complement that of narrow bandwidth non-intrusive electric and magnetic field sensors will be completed.
The effort to develop an HPM source for use in a chamber to address survivability of munitions in an HPM environment will be continued.
The effort to develop an enhanced capacitor bank and ultra-short pulse neutron source to address nuclear vulnerability testing will be continued.

FY 2017 Plans:
Investments in HEL test technologies will be initiated to assess the changes in HEL effects due to the shift of HELs to shorter wavelengths near one micron. This includes efforts to characterize the performance of HEL systems as they test against small targets such as enemy rockets, missiles, artillery, and unmanned aerial vehicles.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 5 / *Directed Energy Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
In the HPM area, measuring the actual cause of HPM effects on electronics will be addressed by measurement of electrical currents within the wires and chips of the electronic targets. DET will also look at new technologies to further address gaps in the availability of sources for MIL-STD-464C testing.			
Accomplishments/Planned Programs Subtotals	5.805	6.526	7.350

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 6 / *C4I & Software Intensive Systems Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
6: *C4I & Software Intensive Systems Test*	51.866	14.448	15.328	13.384	-	13.384	12.722	10.774	10.941	11.160	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project was previously named Net-Centric Systems Test (NST); however, as the project evolved, it became necessary to broaden the scope to include important elements integral to net-centric operations. The new name i.e., Command, Control, Communications and Intelligence (C4I) & Software Intensive Systems Test (C4T) more accurately reflects the scope and content of this project. The C4T project is pursuing test technologies to emulate net-centric military operations in a system-of-systems test environment. This emulation supports analysis and evaluation of the increasing collection of structured and unstructured data generated by complex military test environments. The technology to conduct T&E on software intensive systems is required when testing sensor platforms, command and control systems and weapon platforms that support the kill chain in a Joint operation. These systems must be evaluated for their ability to provide the accurate, timely transfer of data (e.g., target tracks, weapons allocation, mission tasking and situational awareness) as the data passes among the Services and coalition participants.
The technologies within C4T will remove undesired distributed testing biases while improving test agility and the tester's ability to effectively conduct rapid analysis of "Big Data" and automated test reporting. C4T advances test automation features (test planning, test execution, Big Data collection, analysis, and visualization) that enable the virtual integration of Department of Defense (DoD) weapon laboratories and open air ranges. Using modeling and simulation (M&S) along with hardware-in-the-loop (HWIL)laboratories, the effectiveness of Joint missions can be assessed in terms of system-of-systems interoperability and effectiveness in executing Joint mission operations, including testing of weapons and command and control systems accessing and providing information.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: C4I and Software Intensive Systems Test	14.448	15.328	13.384
FY 2015 Accomplishments: The C4T project included efforts that enabled the Test and Training Enabling Architecture (TENA) to utilize remote methods of authentication and privilege management to distributed users. The resulting technologies will support DoD remote authentication T&E needs and next generation multi-level security T&E capabilities. The C4T project developed technologies to support the testing of the cyber robustness of military tactical networks. Specifically the StealthNet project completed and will be utilized in distributed cyber testing of C4I devices across DOD Labs and ranges. The C4T project developed a distributed policy-based access control capability for the TENA middleware. This technology developed end user authentication; enforcement of the defined access control policy prior to joining the TENA execution; and the automatic distribution of the required certificates, keys, and login tokens. The C4T project began development of technologies that apply automated analysis of large net-centric systems data sets using cloud computing technologies. Development of technologies continued to provide an acoustic propagation model of sufficient fidelity to evaluate torpedo performance operating in a range of naval environments.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 6 / *C4I & Software Intensive Systems Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Development will continue on technologies to support the use of TENA over a broad range of networks and to provide common interoperability test architecture. Moreover, C4T will investigate M&S technologies to support emulation and stimulation of networks for conducting T&E. Technology developments will focus on semantic analysis of large structured and unstructured data sets. These technology developments will include the ability to process unstructured test data into a structured format for use by data-to-decision algorithms. Further work on the correlation and analysis of Big Data from multiple sources will continue. The C4T project will develop technologies that mitigate data biases introduced by the test infrastructure. Multi-Level Security (MLS) and Cross Domain Solution (CDS) technologies will be investigated with the goals of improving the automation of preparing test data for analysis as well as facilitating automated sharing of information across all security enclaves. ***FY 2017 Plans:*** Work started in FY 2015 and FY 2016 will continue. The C4T project will invest in developing CDS/MLS and assessing DoD platforms employing Big Data techniques with specific focus on tactical fighters in a net-enabled agile environment. Developments will include verification and validation across integration and aggregation techniques for systems-of-systems evaluation as well as automating testing of warfighter software intensive systems using virtualized and cloud environments.			
Accomplishments/Planned Programs Subtotals	14.448	15.328	13.384

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 7 / *Unmanned and Autonomous System Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
7: *Unmanned and Autonomous System Test*	14.021	5.239	6.686	8.819	-	8.819	9.888	12.697	12.980	13.408	Continuing	Continuing

A. Mission Description and Budget Item Justification

Unmanned and Autonomous Systems (UAS) support every domain of warfare. They operate in space, in air, on land, on the sea surface, undersea and in subterranean conditions to support a vast variety of missions. The emergence of unmanned systems brings a host of revolutionary capabilities that will profoundly influence warfare. The Unmanned and Autonomous Systems Test (UAST) project addresses current and emerging challenges associated with the test and evaluation (T&E) of these critical warfighting capabilities. The technology developments within the UAST portfolio have been prioritized to align with Department of Defense (DoD) guidance on science and technology priority investments, particularly in assessing autonomy. As such, the UAST project is developing test technologies to simulate, stimulate, instrument, measure, and assess an autonomous system's ability to perceive its environment, process information, adapt to dynamic conditions, make decisions, and effectively act on those decisions in the context of mission execution.

The UAST project will provide the test technologies to effectively measure performance and characterize risk, thereby increasing warfighter trust in autonomous systems. Current DoD test capabilities and methodologies are insufficient to address the testing of increasingly autonomous units and teams of unmanned systems operating in unstructured, dynamic, battlespace environments. Furthermore, advancements are being made in developing collaborating, system-of-autonomous-systems that will work in concert as a swarm or pack and in close proximity with humans. New test technologies are needed to stress the collective set of autonomous systems under realistic conditions, predict emergent behavior of autonomous systems, emulate the complex environment, and assess mission performance of these highly coupled and intelligent systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Unmanned and Autonomous System Test	5.239	6.686	8.819
FY 2015 Accomplishments: The UAST project focused on predicting and assessing the autonomy functions of unmanned and autonomous systems through ongoing technology developments. Efforts continued to develop technology to virtualize test sites into ultra-high-fidelity, real-time simulators. The goal is to facilitate verification, assessment, and evaluation of UASs in a realistic, risk mitigated, highly measureable, statistically significant manner prior to field test. The UAST project built automated tools to test the robustness of black-box UASs in unexpected operating scenarios. The technology feeds inputs that trigger software anomalies to find vulnerabilities without costly field testing. The test technology was developed and implemented as a prototype to enable stress testing of black box system autonomy architectures, with a focus on UAS software and the interfaces of the core components without requiring source code. The approach is agnostic to the specific component interfaces. This technology provided testers with a perspective of system performance and a previously unavailable prediction of behavior. Work commenced to develop technology to rapidly develop test plans, assess regression testing, and characterize the biases from the test environment.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Work on the stress testing tool will complete and the tool will transition to T&E activities. New efforts will focus on investing in test technologies supporting the near term challenges identified in the 2013–2038 DoD Unmanned Systems Integrated Roadmap, such as, integrating DoD unmanned systems within the National Airspace and safely operating unmanned aerial systems within the Major Range & Test Facility Bases (MRTFB). The UAST project will further explore test technologies to meet the challenges of testing autonomy by leveraging advances made in the standardization of UAS architectures, functional components, and interfaces. UAST will continue research in the area of autonomous system test planning to develop technologies which develop the most relevant test plans for maritime, air, and ground-based autonomous systems and enable testers to identify the degree of regression testing required for autonomous systems upon changes to the hardware and software. The UAST project will emphasize autonomy test technologies that can be integrated for use in a TENA environment within the MRTFB. UAST will initiate developments to automatically predict test vehicle collisions and cue test range controllers to take corrective action. This system will prevent the test vehicle from violating flight corridor, test range, and warning area boundaries. ***FY 2017 Plans:*** The UAST project will continue development of technology to support testing autonomous ground systems. Development will continue on technologies that predict test air vehicle collisions while preventing the test vehicle from violating flight corridor, test range, and warning area boundaries; these technologies will be made TENA compliant to facilitate transition across the MRTFB. The development of technology that rapidly develops test plans, assesses regression testing required, and characterizes the bias from the test environment and instrumentation will complete. Developments will be fully compliant with TENA and suitable for integration on the Joint Mission Environment Test Capability network. The UAST project will continue to develop test technologies that address mid-term UAS test challenges associated with autonomy and initiate efforts to explore the far term challenges of testing system intelligence. These efforts will include an examination of test technologies that measure the logical flow of sensing data, to perception, decisions, and action. Additionally, the UAST project will focus on enhancing the test environment to assess unmanned threat systems. The UAST project will invest in complementary tools to predict UAS behavior by monitoring how autonomous systems process data in response to environmental changes. The UAST project will investigate technologies for T&E of UAS-to-UAS and human-to-UAS interactions.			
Accomplishments/Planned Programs Subtotals	5.239	6.686	8.819

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 7 / *Unmanned and Autonomous System Test*

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	Project (Number/Name) 8 / *Cyberspace Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
8: *Cyberspace Test*	6.661	5.253	6.576	9.342	-	9.342	11.697	14.113	14.338	14.598	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) ability to use cyberspace for rapid communication and information sharing in support of operations is a critical enabler of DoD military missions. Advancements in utilizing cyberspace are outpacing the technologies needed for test and evaluation (T&E). The Cyberspace Test Technology (CTT) project develops advanced technologies and methodologies to test and evaluate DoD capabilities and information networks to defend and conduct full-spectrum military operations across cyberspace. Current cyberspace T&E capabilities are insufficient to support the continual experimental, contractor, developmental, operational, and live-fire testing requirements of warfighter systems operating in cyberspace. Many of the test tools and infrastructure items required for systems in cyberspace will require advancement and maturation of nascent test technologies. The CTT project will address test technology shortfalls in cyberspace testing, including planning cyberspace tests, creating representative cyberspace threats and test environments, executing cyberspace tests, and performing cyberspace test analysis and evaluation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Cyberspace Test	5.253	6.576	9.342
FY 2015 Accomplishments: The CTT project continued development of automated threat intelligence processing, target folder generation, traffic generation agents, malicious website analysis and cloning, and threat actor motivation. The CTT project completed successful demonstration of a system for threat traffic generation and automated attack, as well as a prototype for instrumentation and data analytics. The CTT project also successfully demonstrated the execution framework, tools, and payloads for automated and verified sanitization processes on specialized information technology assets. The project completed system-level tests and demonstrated a sanitization concept for kinetic assets. This technology will eliminate traces of contaminating cyber-attacks between tests, an essential step in the cyberspace test execution process.			
FY 2016 Plans: The threat and sanitization technology work will finish and transition to cyber test organizations and future test infrastructure development activities. The threat effort will deliver cyberspace threat representation and instrumentation technologies required to assess cyberspace vulnerabilities and improve the agility of cyberspace test capabilities. The sanitization technology development will deliver test technologies to develop a reliable, fast, automated, and cost-effective sanitization approach. This will allow the rapid repurposing of equipment between different tests to meet the expanding requirements for cyber testing. The CTT project will continue to seek out new cyberspace test technology development efforts.			
FY 2017 Plans: The CTT project will pursue technology developments addressing needs to: provide automated cyberspace test planning, create representative cyberspace threats and test environments, execute cyberspace tests, and perform cyberspace test analysis and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603941D8Z / *Test and Evaluation/ Science and Technology*	**Project (Number/Name)** 8 / *Cyberspace Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
evaluation. These efforts will support defensive and offensive cyberspace weapon systems testing, as well as cyber resiliency testing of air, land, and sea-based weapon systems.			
Accomplishments/Planned Programs Subtotals	5.253	6.576	9.342

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	99.115	45.060	41.420	37.329	-	37.329	37.403	39.873	40.304	41.090	Continuing	Continuing
P455: *Operational Energy Capability Improvement*	80.952	45.060	41.420	37.329	-	37.329	37.403	39.873	40.304	41.090	Continuing	Continuing
P456: *Hybrid Energy Storage Module (HESM)*	18.163	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

The basic mission of this program element is to fund innovation to improve the Department of Defense's (DoD) operational effectiveness via targeted operational energy science and technology (S&T) investments. It contains the two projects described below:

P455, the Operational Energy Capability Improvement Fund (OECIF), incentivizes S&T to promote long term change in DoD capabilities so they are better aligned with the Operational Energy Strategy. OECIF generally fosters innovation to improve operational energy performance and has two key mission aspects. First, to develop operational energy technologies and practices that will improve DoD military capabilities and possibly reduce costs. Second, to establish within the military Services institutional momentum to continue those innovations. OECIF funds serve as "seed money" to start or consolidate promising operational energy innovation to be sustained by the Services; accordingly, OECIF generally emphasizes supporting or establishing programs, rather than one-off projects.

P456, the Hybrid Energy Storage Module (HESM), co-sponsored by the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) and the Assistant Secretary of Defense for Energy, Installations and Environment (ASD(EIE)), develops advanced energy storage technologies to maximize performance and reliability, and enable future high power weapons and sensor systems on legacy and next generation vehicles, aircraft and ships. The goals of HESM are to (1) demonstrate energy storage systems with high power/energy densities, scalable to all power levels, that reduce total logistics demand, (2) increase platform ability to sustain operations during engagement, and (3) reduce maintenance. Once demonstration is complete, this technology will be sustained by the Services and will be used to extend the operational performance and safety for these applications beyond the hybrid storage module baseline design configuration. This program is closely coordinated with the Advanced Management and Protection of Energy-storage Devices (AMPED) program of the Department of Energy's (DOE) Advanced Research Projects Agency - Energy (ARPA-E).

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0604055D8Z *I Operational Energy Capability Improvement*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	46.300	37.420	38.912	-	38.912
Current President's Budget	45.060	41.420	37.329	-	37.329
Total Adjustments	-1.240	4.000	-1.583	-	-1.583
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.018	-			
• SBIR/STTR Transfer	-1.222	-			
• Realignment of funds	-	-	-1.294	-	-1.294
• Economic Assumptions Adjustment	-	-	-0.289	-	-0.289

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: P455: *Operational Energy Capability Improvement*		
Congressional Add: *OECI*	-	4.000
Congressional Add Subtotals for Project: P455	-	4.000
Congressional Add Totals for all Projects	-	4.000

Change Summary Explanation

FY 17: Baseline program was reduced to realign funds for higher priorities and achieve efficiencies within the Department of Defense.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement*	Project (Number/Name) P455 / *Operational Energy Capability Improvement*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P455: *Operational Energy Capability Improvement*	80.952	45.060	41.420	37.329	-	37.329	37.403	39.873	40.304	41.090	Continuing	Continuing

A. Mission Description and Budget Item Justification

Operational Energy Capability Improvement Fund (OECIF)

Description: The basic mission of the OECIF is to fund innovation that will improve DoD operational effectiveness via targeted S&T investments. As Defense-Wide funding, it incentivizes S&T to promote long term change in DoD capabilities so they are better aligned with the Operational Energy Strategy. OECIF generally fosters innovation to improve operational energy performance and has two key mission aspects. First, to develop operational energy technologies and practices that will improve DoD military capabilities and possibly reduce costs. Second, to establish within the military Services institutional momentum to continue those innovations. OECIF funds serve as "seed money" to start or consolidate promising operational energy innovations to be sustained by the Services; accordingly, OECIF generally emphasizes supporting or establishing programs, rather than one-off projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Operational Energy Capability Improvement Fund	45.060	37.420	37.329
FY 2015 Accomplishments: The expeditionary outpost energy load reduction and waste to energy (W2E) programs begun in FY12 generally reached their conclusion. The Advanced Energy Efficient Shelter Systems program completed cold weather testing, showing tents with 40% or greater energy efficiency over legacy baseline as well as hot weather testing showing over 80% decrease in energy required to cool a shelter over legacy baseline systems. The Super Energy Efficient Containerized Living Unit (SuperCLU) program replaced 1,000 split heating, ventilation, and air conditioning units at Camp Lemonier, reducing the energy load 40-50% per CLU, and finalized the design for a 40-foot Drop In Replacement SuperCLU. The Innovative Cooling Equipment program successfully demonstrated prototype environmental control units (ECUs) at the July 2015 Natick Base Camp Integration Lab Experiment, and the prototypes demonstrated a 14-56% efficiency improvement over baseline units. The Navy Expeditionary Technology Transition Program (NETTP) fabricated and tested a breadboard (TRL-4/5) prototype Stirling ECU and absorption waste heat driven ECU, and conducted design and performance validation of critical subcomponents for an adsorption waste heat driven ECU. The Transformative Reductions in Operational Energy Consumption program conducted field and lab assessments, transitioned to a 50/50 cost share model with DoD users, and established a knowledge management repository within the Defense Technical Information Center. The W2E program developed and tested four laboratory or pilot-scale W2E conversion technologies focusing on technologies that would be suitable for forward operating bases and overseas contingency operations.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The operational energy consortia programs begun in FY13 continued. The Tactical Microgrid Standards Consortium (TMSC) completed an initial draft of the standards and made them available to DoD experts and industry for comment. The Energy Efficient Outpost Modeling Consortium (EEOMC) completed version 1.0 of the Energy Resource Planning Tool optimization model, finalized the Microgrid application programming interface along with a beta version of the Commander's Application, and began developing an initial course on energy efficiency in expeditionary operations. The Soldier and Small Unit Power consortium investigated the impact on total battery weight of utilizing projected energy harvesting devices, wireless technologies and new weapon sights with the desktop analysis tool, completed a low power tactical communications study, and measured baseline equipment with a test bed. The Engineered Surface Materials and Coatings Drag Reduction consortium continued maturing and testing designs for select drag reduction technologies and selected winners of a drag reduction "Challenge" to bring in new innovators. The analytical methods and tools programs started in FY14 have ramped up. The Synthetic Theater Operations Research Model-Energy (STORM-E) began creating a comprehensive campaign energy analysis roadmap, identified key information inject points to influence budget decisions, and conducted initial campaign studies to bound method/tool/data requirements. The Army's Operational Energy Analysis Task Force (OEATF) began developing a collaborative data sharing capability among the Army analytical agencies, initiated verification and validation (V&V) of three performance level models that will be relied upon to produce certifiable data, completed one of three scenario enhancements, and began making enhancements to four system and force level modeling and simulation (M&S) tools included in their toolkit. The Joint Deployment Energy Planning and Logistics Optimization Initiative (J-DEPLOI) program mapped current joint combatant command deliberate planning processes related to energy and determined areas in most need of decision support or automation and reviewed over 60 decision support tools for potential use. The Comprehensive Operational Energy (COE) Toolkit program completed the methodology to use existing tools to calculate the damage enemy attacks have on base fuel systems. The Navy's Mission Engineering Analytical Method for Operational Energy program (MEAM) successfully demonstrated a method for computing combat capability as a function of fuel usage, optimal delivery, and developed a set of prototype tools to calculate these metrics for a peacetime scenario. The Capability Assessment and Modeling for Energy Logistics (CAMEL) program completed analysis of counter operational energy impacts on the logistics chain, began preliminary analysis of these impacts within an anti-access/area-denial (A2AD) environment, began analysis of advanced combat air engine technology on future air operations, and initiated upgrade of modeling, simulation, and analysis (MS&A) tools. The major new program started in FY15 is called "Improving Fuel Economy for the Current Ground Tactical Fleet Program." This program will strive to achieve significant fuel efficiency increases in the existing tactical ground vehicle fleet through advancing technologies in four major areas: automation/smart cruise control, vehicle auxiliary electrification, more thermally efficient cylinders, and an M&S tool for investigating vehicle light-weighting. This program is led by the Army Tank Automotive Research,			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Development & Engineering Center along with the Office of Naval Research and conducted in coordination with the Department of Energy's Vehicle Technology Office. This program conducted kick-off meetings and initiated technology development. Another new FY15 program, the Joint Infantry Company Prototype (JIC-P), is a joint Army and Marine Corps program, led by the Marine Corps Expeditionary Energy Office, combining power management, distribution, storage, and kinetic energy harvesting technology with operational testing at the company level. The intent of the program is to increase the self-sustainability of dismounted forces in austere environments and decrease the battery weight that they carry. This program obtained power management, distribution, storage and energy harvesting equipment and conducted initial integration, performance and safety tests. Using the additional FY15 funding provided by Congress, OECIF has started several shorter term projects to complement existing OECIF programs or explore new directions. This includes projects to: test and evaluate new Soldier power equipment and develop a light ultra-capacitor substitute for radio batteries; quantify the cyber security threat to energy industrial control systems and how DoD might protect itself; reduce ground-based fuel consumption in austere environments by leveraging modern behavior change insights; develop and test novel membrane based dehumidification systems to reduce the air conditioning energy consumption of ground forces and ships in dock; formulate waste heat recovery analysis tools based on steady-state thermodynamics and begin development of novel heat exchangers for turbine waste heat collection; demonstrate small tactical unmanned aerial vehicles (UAV) that use solar cells and thermal soaring to stay aloft; establish an instrumented maritime testbed program to demonstrate and speed adoption of emerging, maritime energy-saving technologies in a shipboard environment; explore the utility of configuring M&S federations to explore energy-related analytic questions relevant to DoD; and, support the Joint Deployable Waste to Energy (JDW2E) group, which develops concept of operations, requirements, and testing protocols for waste to energy systems. ***FY 2016 Plans:*** The NETTP will conduct a Technology Readiness Level 6 test of a Stirling ECU and waste heat driven ECUs. The consortia programs will generally enter their last year. TMSC will incorporate DoD and industry comments and finalize the draft Tactical Microgrid Standards. EEOMC will complete the V&V plan for the Energy Resource Planning Tool, update the Commander's Application to enhance mode prioritization and optimization of generators and demonstrate with hardware, and offer pilot courses on energy efficiency in expeditionary operations. The Soldier and Small Unit Power consortium will continue to develop the desktop analysis tool, finalize measuring baseline equipment and new prototype equipment within a test bed, conduct field demonstrations to validate a 30 percent savings on software modified tactical radios and develop an Operationally Wearable Measurement System. The Engineered Surface Materials and Coatings Drag Reduction consortium will conduct flight tests,			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
as appropriate, review proposals and make Phase 1 technology maturation awards to the selected drag reduction “Challenge” winners. The analytical methods programs will continue. STORM-E will translate tool-based roadmap priorities into their spiral 1 build and shift scenario development to scenarios examined through the Marines Expeditionary Force 21 lens. OEATF will complete V&V of three performance level models, complete model enhancements of three system and force level M&S tools, complete scenario enhancements for the second of three scenarios, and begin transformation of the Logistics Battle Command (LBC) model into a decision support tool. J-DEPLOI will begin adaption of existing software code to address the new prioritized areas for fuel planning and work on an operational fuel planning Implementation Directive. The COE Toolkit program plans to complete the programming and graphical user interface for a comprehensive model to examine the impact of enemy OE-interdiction on aircraft sortie generation. MEAM will integrate and refine prototype tools with as much verified fuel consumption data as can be identified and develop a range of excursion assessments based upon wartime scenario(s), establish cost analysis methodology, and investigate the ability of the tool to support future surface combatant platform design and force structure. CAMEL will develop the methods and tools to explore airlift and aerial refueling effects within A2AD environments, explore the impact of counter operational energy threats and alternative basing strategies, complete analysis of advanced combat engine technology impacts, and begin analysis of costs incurred with flex basing. The FY15 vehicles program will continue. The autonomy project plans to complete single vehicle simulation, upgrade hardware, and conduct vehicle tests. The electrification project plans to initiate system lab testing, create M&S controls and software, and begin system integration testing. The project to produce more thermally efficient cylinders plans to continue development of a thermal barrier coating, complete advanced research on piston development, and initiate engine testing. The M&S tool project plans to develop the analytical framework for the model and examine subsystems baseline weight optimization. JIC-P will further develop the integrated system, perform small scale user evaluations with multiple units, conduct a human factors study on the kinetic harvesters, and continue to improve M&S data. Current units targeted for initial training and evaluation are the Army's 2nd BN-27th Infantry Regiment and 3rd Marine Regiment; both located in Hawaii. For the shorter term projects, plans for FY16 include: continue Operational Test and Evaluation of new Soldier power equipment, and advance the Soldier Power program to Milestone-C/Low-Rate Initial Production; investigate possible protections to cyber-security threats at defense fuel supply points and installations; implement a data collection plan to develop a set of behavior change strategies and design an experiment to verify the efficacy of those strategies; test novel membrane based dehumidification systems to reduce the air conditioning energy consumption of ground forces and ships in dock; improve analysis tools, analyze integration of a waste heat recovery system into a representative Naval platform, and begin fabrication of an exhaust gas heat exchanger for a 2017 demonstration with a gas turbine waste heat recovery system; integrate photovoltaic panels, power management and max power point tracking into the UAVs and conduct flight tests of up to five UAVs demonstrating			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
through-the-night and multiple day endurance with zero fuel; conduct at-sea tests of promising energy-saving technologies and establish an enduring process for companies to quickly try out their technologies at sea; and prepare for a W2E industry day, develop guidance for contingency base waste management, and demonstrate a medium-sized waste disposal system. New programs starting in FY16 will reflect a shift within OECIF from an emphasis on contingency bases to one on mobile platforms and the Pacific. The new program focus will be on improving the operational energy performance of unmanned air, sea and ground systems that could be used in the Pacific. This could cover such improved capabilities as increased unrefueled range/ endurance, greater payload and payload power, and improved prime mover reliability and fuel flexibility -- all while operating in contested operating environments over long distances. ***FY 2017 Plans:*** A few consortia programs will still be active. TMSC will validate and submit the draft Tactical Microgrid Standards for DoD concurrence. The Soldier and Small Unit Power consortium will finalize development of the Operationally Wearable Measurement System and participate in the JIC-P demonstration event. The analytical methods programs will continue. STORM-E plans to build spiral 2 based on FY16 lessons learned and conduct theater studies in order to identify energy-based risk to operations, examine mitigation solutions, and shape plans and programs. OEATF will complete V&V of the four system and force level M&S tools, complete scenario enhancements for the third of three scenarios, and complete the transformation of the LBC model into a decision support tool. J-DEPLOI plans to continue to develop the selected decision support tool for joint fuel logistics support and refine the Implementation Directive. MEAM plans to assess future force structure and logistics force implications, investigate incorporating Joint and Coalition operations, define warfighting operational effectiveness tactical decision aid requirements, and develop a production plan for resulting tools and methods. CAMEL will analyze concepts of operations associated with flex basing strategies and the impact to operational energy within airlift and aerial refueling missions, continue to explore overall costs associated with flex basing, and continue enhancements to the MS&A tool. The FY15 vehicles program will continue. The automation project will conduct convoy vehicle simulation. The electrification project will complete system integration lab testing, develop M&S controls and software, initiate vehicle integration and testing, and initiate procurement and testing of optimized components. The project to produce more thermal efficient cylinders will complete development of the thermal barrier coating and continue engine testing. The M&S tool project will incorporate novel material analytics and explore advanced technologies optimization. JIC-P will culminate in a dismounted company side-by-side user evaluation to quantify and qualify the sustainment of dismounted infantry using system prototype developed technology.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
The membrane dehumidification program will test prototype membranes with 10-ton and 1-ton compressors to measure system performance of membrane based dehumidification systems. The programs begun in FY16 for more energy effective unmanned systems for the Pacific will continue to ramp up during this fiscal year. New programs starting in FY17 may continue the shift within OECIF toward a greater emphasis on fuel consuming mobile platforms and the Pacific. The focus of these new FY17 programs is likely to reflect input from the Services, various research Communities of Interest within DoD, such as Energy and Power, Ground and Sea Platforms, and Air Platforms and any developing gaps or opportunities identified by ODASD(OE).			
Accomplishments/Planned Programs Subtotals	45.060	37.420	37.329

	FY 2015	FY 2016
Congressional Add: OECI	-	4.000
FY 2016 Plans: For the shorter term projects, plans for FY16 include: continue Operational Test and Evaluation of new Soldier Power equipment, and advance the Soldier Power program to Milestone-C/Low-Rate Initial Production; investigate possible protections to cyber-security threats at defense fuel supply points and installations; implement a data collection plan to develop a set of behavior change strategies and design an experiment to verify the efficacy of those strategies; test novel membrane based dehumidification systems to reduce the air conditioning energy consumption of ground forces and ships in dock; improve analysis tools, analyze integration of a waste heat recovery system into a representative Naval platform, and begin fabrication of an exhaust gas heat exchanger for a 2017 demonstration with a gas turbine waste heat recovery system; integrate photovoltaic panels, power management and max power point tracking into the UAVs and conduct flight tests of up to five UAVs demonstrating through-the-night and multiple day endurance with zero fuel; conduct at-sea tests of promising energy-saving technologies and establish an enduring process for companies to quickly try out their technologies at sea; and prepare for a W2E industry day, develop guidance for contingency base waste management, and demonstrate a medium-sized waste disposal system.		
Congressional Adds Subtotals	-	4.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P455 / *Operational Energy Capability Improvement*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

None

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement*	Project (Number/Name) P456 / *Hybrid Energy Storage Module (HESM)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P456: *Hybrid Energy Storage Module (HESM)*	18.163	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

P456, the Hybrid Energy Storage Module (HESM), co-sponsored by the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) and the Assistant Secretary of Defense for Energy, Installations and Environment (ASD(EIE)), develops advanced energy storage technologies to maximize performance and reliability, and enable future high power weapons and sensor systems on legacy and next generation vehicles, aircraft and ships. The goals of HESM are to (1) demonstrate energy storage systems with high power/energy densities, scalable to all power levels, that reduce total logistics demand, (2) increase platform ability to sustain operations during engagement, and (3) reduce maintenance. Once demonstration is complete, this technology will be sustained by the Services and will be used to extend the operational performance and safety for these applications beyond the hybrid storage module baseline design configuration. This program is closely coordinated with the Advanced Management and Protection of Energy-storage Devices (AMPED) program of the Department of Energy's (DOE) Advanced Research Projects Agency - Energy (ARPA-E).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Hybrid Energy Storage Module (HESM)	0.000	-	-

Description: P456, the Hybrid Energy Storage Module (HESM), co-sponsored by the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) and the Assistant Secretary of Defense for Energy, Installations and Environment (ASD(EIE)), develops advanced energy storage technologies to maximize performance and reliability, and enable future high power weapons and sensor systems on legacy and next generation vehicles, aircraft and ships. The goals of HESM are to (1) demonstrate energy storage systems with high power and energy densities, scalable to all power levels that reduce total logistics demand, increase platform ability to sustain operations during engagement, and (2) reduce maintenance. Once demonstration is complete, this technology will be sustained by the Services and used to extend the operational performance and safety for these applications beyond the hybrid storage module baseline design configuration. This program is closely coordinated with the Advanced Management and Protection of Energy-storage Devices (AMPED) program of the Department of Energy's (DOE) Advanced Research Projects Agency - Energy (ARPA-E).

FY 2015 Accomplishments:

The hybrid energy storage module efforts initiated in FY12 were continued including hybrid energy storage research of application oriented model development, establishment of test-beds and device limitation characterization at the Service laboratories for military specific applications, design architecture for plug-and-play capabilities, definition of safety metrics, and V&V of advanced complex controls. Initial Navy ships energy storage HESM unit demonstrations were successfully completed and transitioned to the Services with a technology transition agreement signed by the Office of Naval Research, Naval Sea Systems Command, and the Office of Chief of Naval Operations. Prior successful HESM efforts associated with Army and USMC battlefield generators

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement*	**Project (Number/Name)** P456 / *Hybrid Energy Storage Module (HESM)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
were transitioned to the Services with a technology transition agreement signed by the Office of Naval Research and US Marine Corps Systems Command.			
Accomplishments/Planned Programs Subtotals	0.000	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

None

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0303310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	86.953	44.690	42.404	44.836	-	44.836	42.436	45.874	46.503	47.411	Continuing	Continuing
P*004: *Countering Weapons of Mass Destruction Systems*	86.953	44.690	42.404	44.836	-	44.836	42.436	45.874	46.503	47.411	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Countering Weapons of Mass Destruction (CWMD) Systems program is researching, developing, integrating, testing, and deploying, a CWMD situational awareness system. This system will enable a comprehensive, global capability for situational awareness of threats from Weapons of Mass Destruction (WMD) as well as global efforts to counter those threats. This system will enable a shared understanding of the CWMD operating environment and will support planning and decision-making by the U.S. government and its partners. The CWMD mission space is characterized by immense amounts of information, such as the characteristics and location of WMD related facilities and materials, personnel and expertise, and dual-use technologies. The CWMD Systems program comprises next-generation advanced information technologies, coupled with affiliated fusion cells, to locate, gather, access, share, and visualize this WMD-relevant information to facilitate collaboration and decision-making. These solutions will revolutionize CWMD knowledge management, providing decision makers and operational personnel a dynamic, tailorable, and holistic view of the global CWMD operating environment.

The diversity and complexity of the CWMD mission requires an integrated approach toward capability development, based on a systems perspective that links strategic objectives with interrelated tasks and associated capabilities. The CWMD mission is intertwined with counter-terrorism and homeland defense and hence system development must leverage and integrate complementary technologies developed to support other mission areas. The CWMD Systems program also will enable international collaboration in countering WMD by breaking down unnecessary data stove-pipes and by enabling the U.S. Government and its partners to access and share knowledge.

This program also responds to the strategic needs outlined in the 2014 Quadrennial Defense Review (QDR), the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance (DPG), and capability requirements approved by the Joint Requirements Oversight Council (JROC). The CWMD Systems program will develop and field a global CWMD situational awareness capability to meet the needs of Combatant Commands, the Office of the Secretary of Defense (OSD), the Joint Staff, the Services, and Defense Agencies. Other U.S. Government Departments and Agencies will be able to utilize this capability to support their mission needs and collaborate with the DoD. This program is designed to leverage existing DoD resources and proven approaches to achieve its goals and rapidly deliver an operational capability.

The CWMD Systems portfolio is supported by two Research, Development, Test & Evaluation (RDT&E) program elements (0303310D8Z for RDT&E of advanced materiel and non-materiel solutions, and 0607310D8Z for upgrades or improvements to fielded systems), as well as an Operations and Maintenance (O&M) "CWMD Sustainment" line (ORC-2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

This Program Element (PE) will fund travel to support the requirements of this program.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0303310D8Z *I Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research, development and test and evaluation efforts.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	46.001	42.488	45.335	-	45.335
Current President's Budget	44.690	42.404	44.836	-	44.836
Total Adjustments	-1.311	-0.084	-0.499	-	-0.499
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.018	-			
• SBIR/STTR Transfer	-1.293	-			
• FFRDC	-	-0.084	-	-	-
• Economic Adjustments	-	-	-0.347	-	-0.347
• Fiscal Guidance Adjustment	-	-	-0.152	-	-0.152

Change Summary Explanation

Increase necessary to transfer emerging capabilities from the Build 1 Developmental Prototype (DP1) to the Build 0 Operational Testing of New Technologies in FY17.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0303310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*	Project (Number/Name) P*004 / *Countering Weapons of Mass Destruction Systems*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P*004: *Countering Weapons of Mass Destruction Systems*	86.953	44.690	42.404	44.836	-	44.836	42.436	45.874	46.503	47.411	Continuing	Continuing

A. Mission Description and Budget Item Justification

The CWMD Systems program is researching, developing, integrating, testing, and deploying a CWMD situational awareness system. This system will enable a comprehensive, global capability for situational awareness of threats from WMD as well as global efforts to counter those threats. This system will enable a shared understanding of the CWMD operating environment and will support planning and decision-making by the U.S. government and its partners. The CWMD mission space is characterized by immense amounts of information, such as the characteristics and location of WMD-related facilities and materials, personnel and expertise, and dual-use technologies. The CWMD Systems program comprises next-generation advanced information technologies, coupled with affiliated fusion cells, to locate, gather, access, share, and visualize this WMD-relevant information to facilitate collaboration and decision-making. These solutions will revolutionize CWMD knowledge management, providing decision makers and operational personnel a dynamic, tailorable, and holistic view of the global CWMD operating environment.

The diversity and complexity of the CWMD mission requires an integrated approach toward capability development, based on a systems perspective that links strategic objectives with interrelated tasks and associated capabilities. The CWMD mission is intertwined with counter-terrorism and homeland defense and hence system development must leverage and integrate complementary technologies developed to support other mission areas. The CWMD Systems program also will enable international collaboration in countering WMD by breaking down unnecessary data stove-pipes and by enabling the U.S. Government and its partners to access and share knowledge.

This program also responds to the strategic needs outlined in the 2014 QDR, the DoD Strategy for Countering WMD, the FY2016-2020 DPG, and capability requirements approved by the JROC. The CWMD Systems program will develop and field a global CWMD situational awareness capability to meet the needs of Combatant Commands, the OSD, the Joint Staff, the Services, and Defense Agencies. Other U.S. Government Departments and Agencies will be able to utilize this capability to support their mission needs and collaborate with the DoD. This program is designed to leverage existing DoD resources and proven approaches to achieve its goals and rapidly deliver an operational capability.

The CWMD Systems portfolio is supported by two RDT&E program elements (0303310D8Z for RDT&E of advanced materiel and non-materiel solutions, and 0607310D8Z for upgrades or improvements to fielded systems), as well as an O&M line "CWMD Sustainment" (ORC-2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

This PE will fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research, development and test and evaluation efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0303310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*	**Project (Number/Name)** P*004 / *Countering Weapons of Mass Destruction Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Countering Weapons of Mass Destruction (CWMD) Systems	44.690	42.404	44.836

Description: • Research, develop, test, and evaluate materiel and non-materiel solutions to locate, gather, fuse, share, and visualize WMD and CWMD information, and facilitate collaboration and decision-making.
• CWMD Systems will support development of capabilities to: identify, classify and prioritize global WMD threats and vulnerabilities; maintain awareness of US and partner CWMD activities; support US and partner planning and decision making for CWMD;, support collaboration across the CWMD community; and visualize information for analysts, operators, and decision-makers.
• Materiel solutions will include an enterprise-scale common data and applications platform (named Constellation), operating on the DoD Information Network (DoDIN), specifically the Non-classified Internet Protocol Router Network (NIPRNet), the Secret Internet Protocol Router Network (SIPRNet), and the Joint World-wide Intelligence Communications System (JWICS), as well as interfacing with off-DODIN information sources via open-source protocols.
• The Constellation information system will obtain, analyze, and fuse global information about WMD threat and CWMD operations, activities, and plans, and provide analysts, operators, and decision-makers access to this information via a single, comprehensive information environment.
• Non-materiel solutions include affiliated fusion cells that will monitor, analyze, and disseminate integrated WMD intelligence and information and CWMD activities in support of Combatant Commands, the Services, Defense Agencies, and U.S. Government partners in the CWMD mission. Information sharing with foreign governments will be governed by applicable policy and statute.

FY 2015 Accomplishments:
• Continued development and integration of software applications tied to demonstrations, exercises, experiments, and deployments.
• Completed staffing of two 20-person fusion cells at the Defense Threat Reduction Agency (DTRA) / U.S. Strategic Command (USSTRATCOM) Center for Combating Weapons of Mass Destruction (DTRA/SCC-WMD) and the Defense Intelligence Agency (DIA). Trained personnel in fusion cells, and developed, tested, and implemented workflows for analysis, reachback support, and feedback to support ongoing development of data and applications capabilities.
• Continued to build/upgrade/modify the required infrastructure, including hardware and software for computational and processing capabilities, training, and organizational support.
• Achieved network and system certifications and accreditations for mature technologies that were deployed as part of risk reduction effort to meet emerging needs of users.
• Rapidly developed and deployed an unclassified interagency dashboard for information sharing across the U.S. Government to enable common situational awareness of the Ebola outbreak in West Africa and U.S. and international response efforts. The Ebola dashboard attracted over 800 users from over 100 different U.S. Government offices.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0303310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*	**Project (Number/Name)** P*004 / *Countering Weapons of Mass Destruction Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• At the request of U.S. Central Command (USCENTCOM), supported stand-up of USCENTCOM's WMD Pathway Defeat organization through table-top exercises, focused on deliberate planning for a real-world WMD challenge in the USCENTCOM region. • Conducted an interagency table-top exercise for U.S. Embassy in Singapore, partnered with Naval Postgraduate School (NPS) and U.S. Special Operations Command (USSOCOM), Pacific, in Aug 2015, focused on WMD counterproliferation and additive manufacturing. • Sustained technical partnerships with the United Kingdom's (UK) Defense Science and Technology Laboratory (DSTL) to develop interoperability between U.S. and UK cloud environments and with Navy, Air Force, Army, and Strategic Capabilities Office (SCO) for cooperative development of the Tactical Cloud Reference Implementation (TCRI) data and analytics framework. ***FY 2016 Plans:*** • Receive approval of CWMD Situational Awareness (SA) Information System Initial Capabilities Document (IS ICD) by the JROC and refine capability needs based on user input and feedback on developmental prototype. • Receive authorities to operate developmental prototype information system (named Constellation) on NIPRNET, SIPRNET, and JWICS networks and a secure instance on the World Wide Web. • Implement initial cross-domain solutions to securely transfer information from lower classification networks to higher classification networks. • Deploy Constellation developmental prototype by third quarter of fiscal year 2016 for limited set of users at Combatant Commands, DTRA, and DIA. • Expand Combatant Command, interagency, and international mission partnerships to identify user needs, support system development, develop data access and sharing agreements, and initial use of prototype information system. • Achieve full manning (level of effort and skillset) capacity for fusion cells. • Conduct table-top and operational exercises and experiments to further refine Combatant Command, interagency and other mission partner user needs, including injects into multiple high-profile DoD exercises. ***FY 2017 Plans:*** • Transition Constellation developmental prototype to operational prototype in third quarter of fiscal year 2017. • Expand user base to include all Combatant Commands and other DoD Components as well as key U.S. Government agencies and Allied governments. • Implement cross-domain solutions to securely transfer data across multiple classification domains and information networks. Target capabilities may include federated query across classification boundaries.			
Accomplishments/Planned Programs Subtotals	44.690	42.404	44.836

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0303310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Advanced Technology Development (ATD)*	**Project (Number/Name)** P*004 / *Countering Weapons of Mass Destruction Systems*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Assess utility of CWMD Situational Awareness information system (Constellation) beginning with the deployment of a developmental prototype in FY16 with incremental capability releases that mature into an operational CWMD situational awareness capability, through application of agile infrastructure and software development methodologies.

E. Performance Metrics

Success in this area is measured by compliance with various statutes and DoD directives that govern the conduct of the affairs within the Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs (OASD/NCB). Maintain cost, schedule, and performance reporting, review, and adjudication. Maintain requirements traceability matrix.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	140.209	40.088	31.648	28.498	-	28.498	33.677	35.915	37.232	36.347	Continuing	Continuing
P162: *Nuclear and Conventional Physical Security*	116.854	27.897	28.304	27.535	-	27.535	31.105	33.707	34.148	35.131	Continuing	Continuing
P041: *CNT Rad/Nuc Passive Defense ADC&P*	1.927	0.000	0.000	0.000	-	0.000	1.187	0.556	2.149	0.000	Continuing	Continuing
P040: *National Technical Nuclear Forensics Systems*	21.428	12.191	3.344	0.963	-	0.963	1.385	1.652	0.935	1.216	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the need to defend and deter against weapons of mass destruction (WMD) threats and to safeguard personnel; prevent unauthorized access to equipment, installations, material, and documents; and to safeguard the foregoing against espionage, sabotage, damage, and theft. This program oversees advanced engineering development throughout DoD for an integrated and systemic RDT&E approach for countering nuclear threats and nuclear and conventional physical security technology and systems. The funding has been centralized in this Defense-wide PE since the early 1990s and represents a substantial portion of all DoD physical security RDT&E funding. Priorities for this PE RDT&E efforts are driven by inputs from Quadrennial Defense Review guidance, Combatant Command and Service requirements, analysis reports such as “Protecting the Force: Lessons from Fort Hood," January 2010, the Integrated Unit, Base, and Installation Protection Cost Benefits Analysis, Multi-national Work Plans established through the Nuclear Security Summit process, and DoD Directive 5210.41, Security Policy for Protecting Nuclear Weapons-directed requirements and associated security deviation reports.

Under this integrated approach, funds are used to provide advanced component development and prototypes for the Department in seven capability areas: (1) Detection and Assessment; (2) Access Controls; (3) Installation and Transport Security; (4) Storage and Safeguards; (5) Prevention; (6) Decision Support Systems; and (7) Analytical Support. This program will evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment. The projects under the Program Element either (a) lead to Programs of Record which can transition to Program Element 0604161D8Z for systems development and demonstration (SDD); (b) become technology insertions into existing programs; or (c) advance to being a certified Commercial/Government off-the-shelf product. The PE initiatives are coordinated by the Physical Security Enterprise and Analysis Group. This group is responsible for avoiding duplication of effort and when applicable ensure systems integration and promote interoperability and sustainability.

This PE can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603161D8Z *I Nuclear and Conventional Physical Security/Countering Nuclear Threats*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	41.014	31.710	32.244	-	32.244
Current President's Budget	40.088	31.648	28.498	-	28.498
Total Adjustments	-0.926	-0.062	-3.746	-	-3.746
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.016	-			
• SBIR/STTR Transfer	-0.910	-			
• Internal Realignment of Funds	-	-	9.444	-	9.444
• FFRDC	-	-0.062	-	-	-
• Fiscal Guidance Adjustment	-	-	-0.108	-	-0.108
• Leadership Realignment	-	-	-12.000	-	-12.000
• Efficiency Adjustment	-	-	-0.763	-	-0.763
• Economic Assumptions Adjustment	-	-	-0.319	-	-0.319

Change Summary Explanation

Internally realigned procurement funds in the amount of $9.444M to consolidate funds to transfer the program and resources (-$12.000M) total, from OSD to the Air Force to support strategic implementation of the United States Prompt Diagnostics System.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	Project (Number/Name) P162 / *Nuclear and Conventional Physical Security*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P162: *Nuclear and Conventional Physical Security*	116.854	27.897	28.304	27.535	-	27.535	31.105	33.707	34.148	35.131	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the need to defend and deter against weapons of mass destruction (WMD) threats and to safeguard personnel; prevent unauthorized access to equipment, installations, material, and documents; and to safeguard the foregoing against espionage, sabotage, damage, and theft. This program oversees advanced engineering development throughout DoD for an integrated and systemic RDT&E approach for countering nuclear threats and nuclear and conventional physical security equipment (PSE) technology and systems. The funding has been centralized in this Defense-wide PE since the early 1990s and represents a substantial portion of all DoD PSE RDT&E funding. Priorities for this PE RDT&E efforts are driven by inputs from Quadrennial Defense Review guidance, Combatant Command and Service requirements, analysis reports such as “Protecting the Force: Lessons from Fort Hood," January 2010, the Integrated Unit, Base, and Installation Protection Cost Benefits Analysis, Multi-national Work Plans established through the Nuclear Security Summit process, and DoD Directive 5210.41, Security Policy for Protecting Nuclear Weapons-directed requirements and associated security deviation reports.

Under this integrated approach, funds are used to provide PSE advanced component development and prototypes for the Department in seven capability areas: (1) Detection and Assessment; (2) Access Controls; (3) Installation and Transport Security; (4) Storage and Safeguards; (5) Prevention; (6) Decision Support Systems; and (7) Analytical Support. The projects under the Program Element either (a) lead to Programs of Record – which can transition to Program Element 0604161D8Z for systems development and demonstration (SDD); (b) become technology insertions into existing programs; or (c) advance to being a certified Commercial/Government off-the-shelf product. The PE initiatives are coordinated by the Security Policy Verification Committee and the Physical Security Equipment Action Group. These groups work together to avoid duplication of effort and when applicable ensure systems integration and promote interoperability and sustainability.

This PE can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Detection and Assessment	12.097	9.787	15.225

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: The ability to detect an adversary and assess their intentions is a basic physical security tenant. This capability area will design equipment to identify and warn of unauthorized access to a specified area or installation as well as equipment related to the notification and identification of explosive threats or hazards. ***FY 2015 Accomplishments:*** • Conduct Explosive Detection Equipment testing • Develop wide-area, long-range, foliage, seismic and radiological detection capability (both fixed & mobile) • Develop waterside detection & tracking capability (underwater & land-water interface) • Develop standoff detection, assessment and defeat capability ***FY 2016 Plans:*** • Develop a Joint detection and assessment capability • Develop a multi-sensor detection and discrimination capability to reduce nuisance and false alarms • Compare dual energy X-Ray vehicle imaging systems • Develop a radar processing dynamic structure filter to reduce nuisance and false alarms • Finalize development of the Joint Radiological Detection System • SPAM Transition to Operational Initial Capability (STOIC) • Stand-Off Weapon Defeat IPT • Thermal Imaging Dual-use for Aerosol Monitoring Alarms and Security ***FY 2017 Plans:*** • Develop a Joint detection and assessment capability • Develop a multi-sensor detection and discrimination capability to reduce nuisance and false alarms • Compare dual energy X-Ray vehicle imaging systems • Develop a radar processing dynamic structure filter to reduce nuisance and false alarms			
Title: Access Controls ***Description:*** Controlling access to safeguard personnel and their families and to prevent unauthorized access to critical infrastructure and materials is paramount. This capability area will focus on programs and processes related to the validity and verification of individuals entering or already within a facility. ***FY 2017 Plans:***	-	-	2.855

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Continue to develop a continuous evaluation capability to be able to identify cleared individuals in near real-time who may no longer meet the criteria for retaining a clearance and have become a potential security risk			
Title: Installation and Transport Security ***Description:*** Robust installation and transport security are vital to preventing a weapon of mass destruction attack or the unauthorized access to key assets such as nuclear weapons and special nuclear material. This capability area will focus on programs and equipment intended to improve the physical security profile of fixed sites and facilities, as well as critical items while in-transit. ***FY 2015 Accomplishments:*** • Address technology gaps after Integrated Waterside Security concept demonstration • Continue to develop a near-shore unified tactical response capability ***FY 2016 Plans:*** • Determine the Operational suitability of an Automated Harbor Barrier Gate capability • Develop an enterprise Installation Decision Support Initiative application providing risk analysis and risk mitigation decision support in a secure, web-enabled architecture to be hosted on the DoD's SIPRNET ***FY 2017 Plans:*** • Determine the Operational suitability of an Automated Harbor Barrier Gate capability • Develop an enterprise Installation Decision Support Initiative application providing risk analysis and risk mitigation decision support in a secure, web-enabled architecture to be hosted on the DoD's SIPRNET	4.570	9.266	7.509
Title: Storage and Safeguards ***Description:*** Properly securing critical assets to prevent access by unauthorized persons and implementing control measures that ensure access is limited to authorized persons is the foundation of physical security. This capability area will focus on equipment (e.g., locks, doors, etc.) designed to delay or stop unauthorized entry / access to a specified / localized area. ***FY 2015 Accomplishments:*** • Finalize design of a Semi-Hardened Prime Nuclear Air Force Secure Transport Container • Design an internal delay capability for the Secure Transportable Maintenance System	0.100	-	-
Title: Prevention	1.275	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: The security procedures taken to discourage an adversary from accessing weapons of mass destruction or gaining unauthorized access to critical assets are at the heart of prevention. This capability area will focus on broad spectrum, generic efforts which have the ability to influence multiple areas. ***FY 2015 Accomplishments:*** • Expand engagement opportunities with international partners in Nuclear Security			
Title: Decision Support Systems ***Description:*** Decision support systems serve the management, operations, and planning levels of the DoD physical security enterprise to help to make decisions, which may be rapidly changing and not easily specified in advance. This capability area will focus on command and control equipment and projects related to the creation and enhancement of common operating pictures, and the establishment of common architectures / interface standards. ***FY 2015 Accomplishments:*** • Continue to develop capability to ensure threat alert and response systems are interoperable with equipment used by the DoD and mutual aid partners in the local communities (focus on USEUCOM AOR) • Continue to develop a shared and automated content across the security domains and functional areas, enabling more efficient and accurate personnel vetting, access controls, insider threat prevention and enhanced security operating environments • Analyze the DoD Nuclear Weapons Complex Critical Infrastructure for capability gaps ***FY 2016 Plans:*** • Develop a shared and automated content across the security domains and functional areas, enabling more efficient and accurate personnel vetting, access controls, insider threat prevention and enhanced security operating environments • Develop a risk analysis tool to help commanders' in the field make sound security decisions ***FY 2017 Plans:*** • Finalize the development of a shared and automated content across the security domains and functional areas, enabling more efficient and accurate personnel vetting, access controls, insider threat prevention and enhanced security operating environments • Finalize the risk analysis tool to help commanders' in the field make sound security decisions	5.254	4.836	1.946
Title: Analytical Support ***Description:*** This capability area will focus on studies related to physical security topics and operational and management efforts related to day-to-day activities of the DoD Physical Security Equipment/Countering Nuclear Threats RDT&E Program.	4.601	4.415	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2015 Accomplishments: • Provide DOD and industry the means to achieve PSE interoperability through the development of physical security standards and interface control devices • Develop a comprehensive Physical Security Enterprise Test & Evaluation Program • Conducts analyses and review of requirements, evaluates proposed RDT&E solutions and recommends priorities for the integrated investment portfolio • Analyze alternatives for integrated waterside security for an in transit environment • Enhance global nuclear security and support the US Government for the Nuclear Security Summit ***FY 2016 Plans:*** • Conduct a waterside security stakeholder Table Top Exercise to confirm set of alternatives and select the preferred alternative • Continue to support global nuclear security and support the US Government for the Nuclear Security Summit			
Accomplishments/Planned Programs Subtotals	27.897	28.304	27.535

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The program performance metrics are established/approved through the DoD Physical Security Enterprise and Analysis Group (PSEAG). The cost, schedule and technical progress is reviewed at quarterly PSEAG meetings. Performance variances are addressed and corrective action(s) is(are) implemented as necessary.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Defense Security Enterprise Architecture	Various	Multiple performers : Multiple locations	1.324	1.700		1.450		0.999		-		0.999	-	-	-
Mission Assurance, Threat Alert, Disaster Resiliency and Response	Various	Multiple performers : Multiple locations	1.480	-		-		-		-		-	-	-	-
Continuous Evaluation Concept Demonstration	MIPR	Army Research Laboratory : Adelphi, MD	0.430	-		-		-		-		-	-	-	-
Keystone EUCOM Project	Various	Multiple Performers : Multiple Locations	1.104	1.700		1.845		1.977		-		1.977	-	-	-
Joint Risk Decision Support Tool	MIPR	AF Civil Engineering Center : Tyndall AFB, FL	1.019	1.052		1.800		1.524		-		1.524	-	-	-
Integrated Ground Security, Surveillance and Response Capability	MIPR	Naval Surface Warfare Center Dahlgren Division : Dahlgren, VA	0.612	-		-		-		-		-	-	-	-
Ground-Based Operational Surveillance System	MIPR	NSWC Crane : Crane, IN	2.102	3.250		-		-		-		-	-	-	-
Physical Security Enterprise Program	Various	Multiple Performers : Multiple Locations	93.320	2.751		8.441		2.450		-		2.450	-	-	-
US Navy Spike Weapon System, Improve EO Seeker	MIPR	NAVAIRWARCENWPNDIV : China Lake, CA	0.450	-		-		-		-		-	-	-	-
Near-shore Unified Tactical Response	MIPR	SPAWAR Pacific : San Diego, CA	0.554	-		-		-		-		-	-	-	-
Integrated Waterside Security Concept Demonstration	MIPR	Multiple Performers : Multiple Locations	3.204	-		-		-		-		-	-	-	-
Foliage Penetrating Technology Evaluation	MIPR	Naval Surface Warfare Crane : Crane, Indiana	0.504	-		-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radar Assisted Area Protection	MIPR	US Army ARDEC : Picatinny Arsenal, NJ	1.105	2.874		2.500		-		-		-	-	-	-
Marine Mammal - Vigilant Localization	MIPR	SPAWAR Pacific : San Diego, CA	0.708	-		-		-		-		-	-	-	-
Marine Mammal - Enhanced Interdiction	MIPR	SPAWAR Pacific : San Diego, CA	0.450	-		-		-		-		-	-	-	-
End of Land-water Interface Sensor Project	MIPR	Applied Research Lab: University of Texas : Austin, TX	1.004	1.500		-		-		-		-	-	-	-
Missile Field Defense C3SA	MIPR	SPAWAR Atlantic : Charleston, SC	1.089	-		-		-		-		-	-	-	-
Semi-Hardened PNAF Secure Transportation Container	IA	Sandia National Labs : Albuquerque, NM	0.751	0.000		-		-		-		-	-	-	-
Secure Transportation Maintenance System Internal Delay	IA	Sandia National Labs : Albuquerque, NM	0.741	0.100		-		-		-		-	-	-	-
Radiological Detection System	Sub Allot	Joint Product Manager - Rad/Nuc Defense : Aberdeen, MD	2.965	4.615		-		-		-		-	-	-	-
Automated Harbor Barrier Gate - Operational Suitability	TBD	TBD : TBD	-	1.000		1.250		-		-		-	-	-	-
Detection & Assessment Follow-on	TBD	TBD : TBD	-	1.500		2.500		2.000		-		2.000	-	-	-
Maritime Expeditionary & Transit Security	TBD	TBD : TBD	-	0.760		1.255		1.455		-		1.455	-	-	-
US Navy Spike Weapon System, Common Launch Tube	MIPR	NAVAIRWARCENWPNDIV : China Lake, CA	-	1.000		1.555		0.984		-		0.984	-	-	-

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Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Thermal Imaging Dual-use for Aerosol Monitoring Alarms and Security	TBD	TBD : TBD	-	0.700		1.678		1.788		-		1.788	-	-	-
Multi-sensor Detection and Discrimination	MIPR	TBD : TBD	-	0.590		0.650		0.873		-		0.873	-	-	-
Tactical Security System	TBD	TBD : TBD	-	-		-		2.850		-		2.850	-	-	-
Mobile Integrated Expeditionary Vehicle Inspection Station	TBD	TBD : TBD	-	-		-		2.100		-		2.100	-	-	-
Linear Sensor System for Multi-Threat Detection	TBD	TBD : TBD	-	-		-		1.750		-		1.750	-	-	-
PL1N/PL1 Portable Intrusion Detection System	TBD	TBD : TBD	-	-		-		1.100		-		1.100	-	-	-
JIGSAW Enhanced Capability Suite Technology Development	MIPR	SPAWAR Atl : Charleston, SC	-	-		-		0.800		-		0.800	-	-	-
Secure Communications with Persistent Identification/Blue Force Tracking	TBD	TBD : TBD	-	-		-		1.450		-		1.450	-	-	-
Wide Area Detection Systems	TBD	TBD : TBD	-	-		-		0.800		-		0.800	-	-	-
Radar Detection of UAVs	TBD	TBD : TBD	-	-		-		0.700		-		0.700	-	-	-
		Subtotal	114.916	25.092		24.924		25.600		-		25.600	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
World Institute for Nuclear Security	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	0.300	0.350		0.350		0.350		-		0.350	-	-	-
International Atomic Energy Agency Support	IA	Department of State : Washington, DC	0.200	0.300		0.300		-		-		-	-	-	-
PSEAG Website and ePSEAG Program Management Tool	MIPR	AF Civil Engineering Center : Tyndall AFB, FL	0.265	-		-		-		-		-	-	-	-
Defense Installation Access Control Support	MIPR	AF Civil Engineering Center : Tyndall AFB, FL	0.345	-		-		-		-		-	-	-	-
Physical Security Subject Matter Experts	MIPR	Naval Sea Systems Command : Washington Navy Yard, DC	0.120	0.200		0.250		0.250		-		0.250	-	-	-
		Subtotal	1.230	0.850		0.900		0.600		-		0.600	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Detection & Assessment IPT	MIPR	AF Security Forces Center : Lackland AFB, TX	0.200	0.250		0.350		0.350		-		0.350	-	-	-
PSEAG Top 5 Technical Review	MIPR	Naval Surface Warfare Center Dahlgren Division : Dahlgren, VA	0.508	-		-		-		-		-	-	-	-
DoD Nuclear Weapons Complex Critical Infrastructure Analysis	MIPR	Naval Sea Systems Command : Washington Navy Yard, DC	-	0.255		0.455		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Explosive Detection Equipment Guide	MIPR	NAVEODTECH : Indian Head, MD	-	0.700		0.850		0.985		-		0.985	-	-	-
JASON Study	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	-	0.500		0.525		-		-		-	-	-	-
Monterey Institute of International Studies	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	-	0.250		0.300		-		-		-	-	-	-
		Subtotal	0.708	1.955		2.480		1.335		-		1.335	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	116.854	27.897		28.304		27.535		-		27.535	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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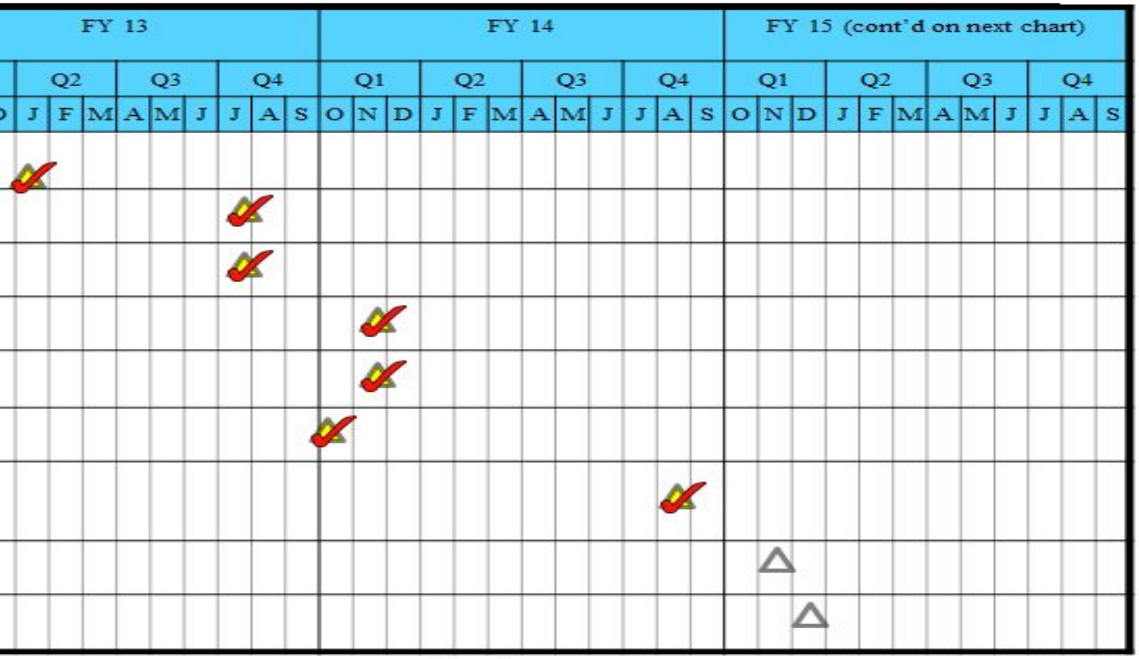
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			Jan 2013
IMS/IMP	July 2013	July 2013	July 2013
Market Survey	July 2013	July 2013	July 2013
RMA Report	Sept 2013	Nov 2013	Nov 2013
Acquisition Decision Memorandum	Sept 2013	Nov 2013	Nov 2013
Phase 1 Close-out	Oct 2013	Oct 2013	Oct 2013
Performance Specification and RFP release	Nov 2013	Aug 2014	Aug 2014
Contract Award	Mar 2014	Dec 2014	
Final Requirements Review	Nov 2013	Dec 2014	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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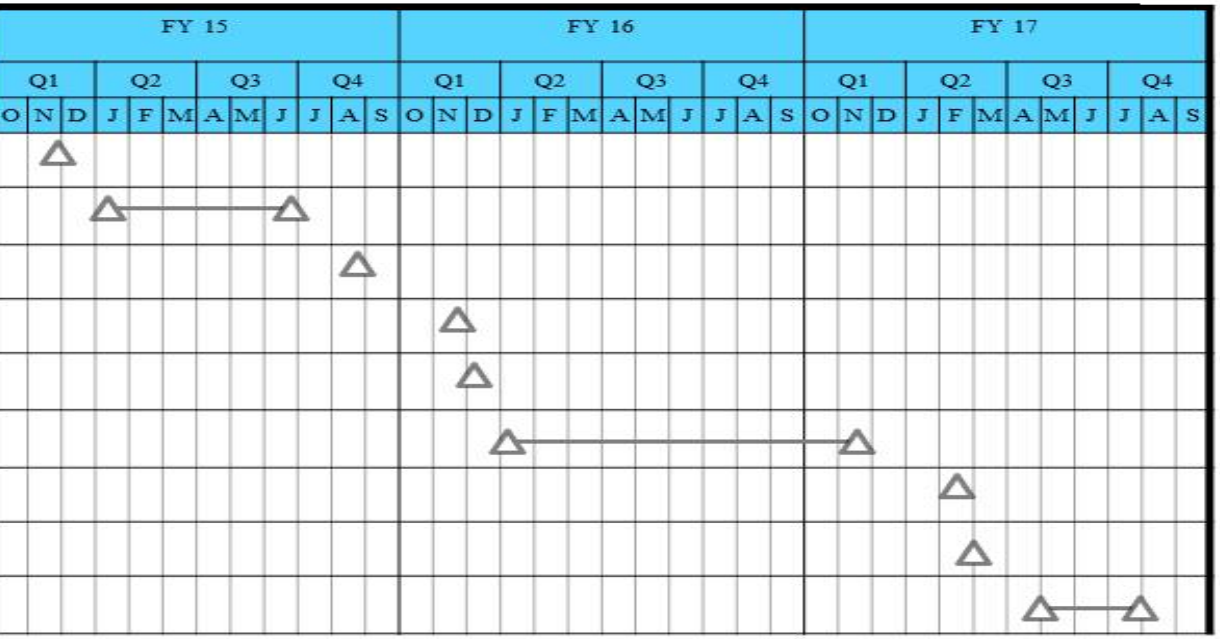
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Phase 2 Close-out	Jun 2014	Nov 2014	
Contractor development + Ctr testing	Jun 2014	Jan 2015 (start)	
Critical Design Reviews	Jan 2015	Aug 2015	
Test Article Deliveries	Feb 2015	Nov 2015	
Phase 3 Close-out	Mar 2015	Dec 2015	
Developmental Testing and OA conducted	Mar 2015	Jan 2016 (start)	
Test Report	Mar 2016	Feb 2017	
Phase 4 Close-out	Mar 2016	Feb 2017	
LRIP Option Award and build	May 2016	Apr 2017 (start)	



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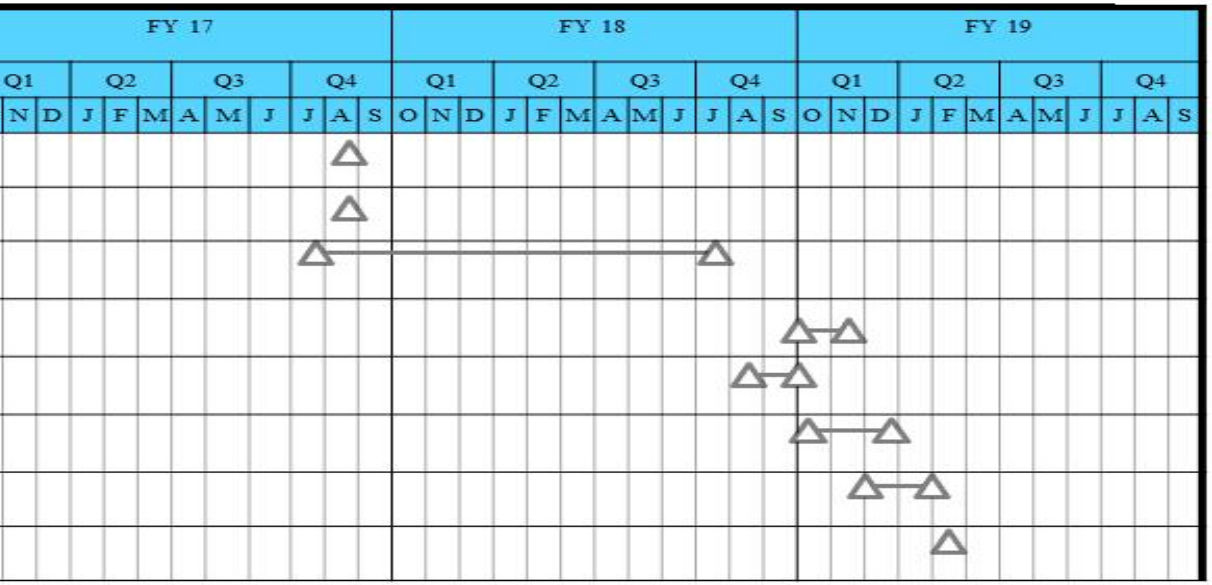
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
LRIP Units delivered	Mar 2017	Aug 2017	
Phase 5 Close-out	Apr 2017	Aug 2017	
First Article Test Planning and Test	May 2017	Jul 2017 (start)	
Log Demo (including training) conducted	Jul 2017	Sep 2018 (start)	
MOT&E (including training) conducted	Oct 2017	Aug 2018 (start)	
FRP OTA Evaluation report	May 2018	Oct 2018 (start)	
JILA Report	Feb 2018	Nov 2018 (start)	
FRP Decision	Jun 2018	Feb 2019	



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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Integrated Waterside Security – Concept Demonstration: Project Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13	FY 14	FY 15
Initiate project coordination with CNIC	05/01/13	07/19/13	05/30/13	100% Complete		
Receive final project approval from NWDC	01/31/2013	07/19/13	01/15/14		100% Complete	
Finalize list of technology inserts	06/15/13	07/19/13	03/30/14		100% Complete	
Conduct IWS concept development conference	08/31/13	07/19/13	11/21/13		100% Complete	
Conduct initial planning conference (IPC)	12/31/13	07/19/13	03/27/14		100 % Complete	
Conduct mid-planning conference (MPC)	03/30/14	07/19/13	06/05/14		100% Complete	
Conduct final planning conference (FPC)	05/30/14	07/19/13	08/14/14		100% Complete	
Conduct final systems integration testing	06/30/14	07/19/13	08/31/14		100% Complete	
Conduct IWS Concept Demonstration	08/31/14	07/19/13	09/26/14		100% Complete	

PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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LEGEND
- △ Planned Actions
- △ In-Progress Actions
- ✓ Completed Actions

G-BOSS(E) Milestones

Milestones	Baseline Date	Current Date	Completed Date
SRR/SFR	November 2013	November 2013	December 2013
TRADOC CDD Approval	Aug 2013	Aug 2013	Aug 2013
CDD 3-Star Approval	Jan 2014	Jan 2014	May 2014
MDD	October 2014	October 2014	October 2014
PDR	October 2015		
CDR	October 2016		

FY 13: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)
FY 14: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)
FY 15: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)

PSEP Milestones:
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- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

IGSSR-C Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13	FY 14	FY 15
Integrated Base Defense Software Synch Meetings	Quarterly				TBD	
Fusion Software Comparison Study	03/29/2013	03/29/3013	03/29/3013	Analysis and Report complete.		
Fusion Software Baseline Validation and Test.	08/30/2013	08/30/2013	09/30/2013		Test and Report complete.	
CDD Joint and Army Staffing	06/15/2013	06/15/2013	06/15/2013	Staffing Complete	CDD Approved (09/30/2013).	
Revised Technology Development Strategy	10/31/2013	Unfunded			Unfunded	
Revised MDD Package for staffing and approval	11/22/2013	Unfunded			Unfunded	
Projected MDD and Milestone B	01/31/2014	Unfunded			MDD Unfunded	MS B

PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Metrics
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LEGEND

△ Planned Actions

△ In-Progress Actions

✓ Completed Actions

Vigilance Localization Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13												FY 14											
				Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Kickoff Meeting Completed	11/30/2012	11/5/2012	11/5/2012	✓																							
Integrated Master Plan Submitted	11/30/2012	11/30/2012	11/30/2012	✓																							
Planning and prep Complete	12/28/2012	12/28/2012	12/28/2012	✓																							
Design Complete	6/15/2013	6/15/2013	5/31/2013								✓																
Build Complete	7/19/2013	12/9/2013	12/2013															✓									
Tech Demo	10/15/2013	12/11/2013	12/20013															✓									
Ops Demo	7/15/2014	7/15/2014	01/2014																						✓		
Transition	9/30/2014	9/30/2014	9/30/2014																								✓
Final Report Submitted	9/30/2014	9/30/2014	9/30/2014																								✓

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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Enhanced Interdiction Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kickoff Meeting Completed	5/15/2013	5/15/2013	5/15/2013
Integrated Master Plan Submitted	5/31/2013	5/31/2013	5/31/2013
Planning and prep Complete	5/15/2013	5/15/2013	5/15/2013
Design Complete	12/31/2013	12/31/2013	12/31/2013
Build Complete	2/21/2014	4/15/2014	4/15/2014
Tech Demo	5/14/2014	5/22/2014	
Ops Demo	1/5/2015	1/5/2015	
Transition	3/30/2015	3/30/2015	
Final Report Submitted	5/25/2015	5/25/2015	

FY 13 (Q3: A M J; Q4: J A S) | FY 14 (Q1: O N D; Q2: J F M; Q3: A M J; Q4: J A S) | FY 15 (Q1: O N D; Q2: J F M; Q3: A M)

Bangor on 7 May, KB on 22 May

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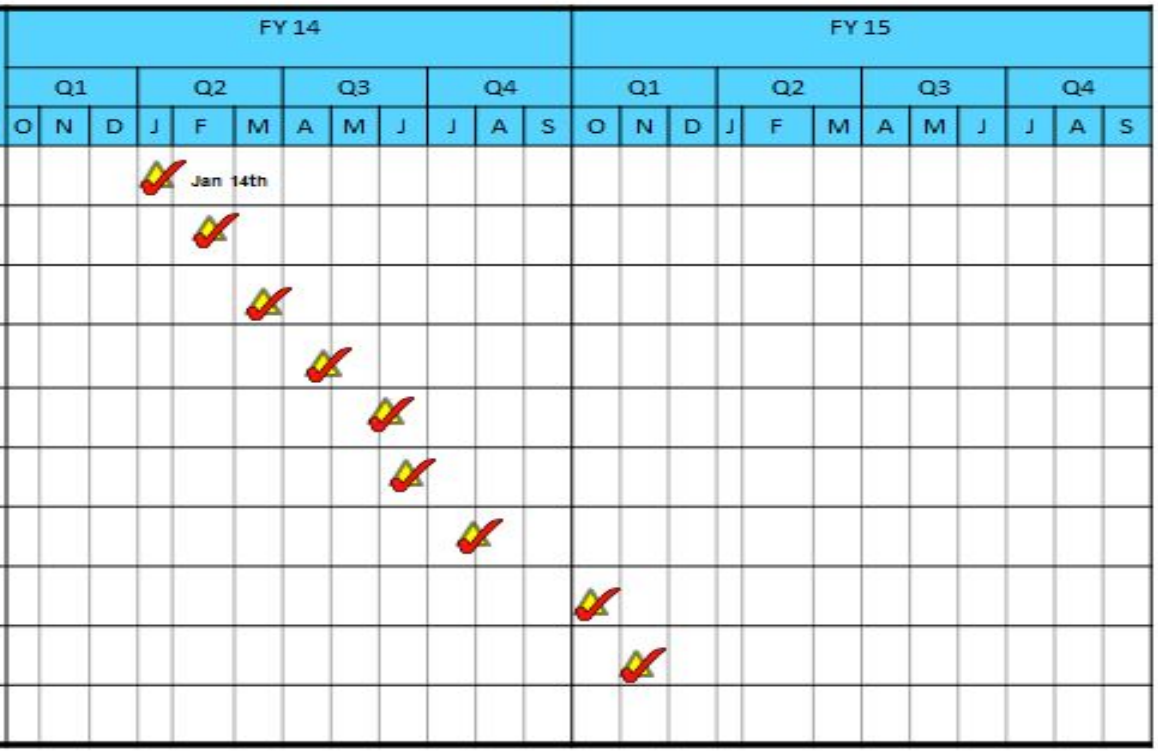
LEGEND
Planned Actions
In-Progress Actions
Completed Actions

Foliage Penetration Technology Evaluation Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kickoff Meeting	1/14/2014	1/14/2014	1/14/2014
Visit Test Site	2/11/2014	2/11/2014	2/11/2014
Submit Draft Test Plan	3/21/2014	3/21/2014	3/21/2014
Finalize Test Site and Vendor Requirements	4/4/2014	4/4/2014	4/16/2014
Submit Final Test Plan	5/9/2014	5/16/2014	6/5/2014
Demonstration	6/16-26/2014	6/16-26/2014	6/16-26/2014
Project Update Meeting	7/18/2014	7/31/2014	7/31/2014
Submit Draft Test Report	10/01/2014	10/01/2014	10/01/2014
Submit Final Test Report	11/12/2014	11/12/2014	11/12/2014



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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Standoff Weapons Defeat IPT Milestones

Milestones	Baseline Date	Current Date	Completed Date
Identify IPT Principals and supporting members	31 July 14		
Develop POAM	15 Nov 14 (Final)		
Develop Charter	15 Nov 14 (Final)		
Identify past and ongoing efforts	15 Sep 14		
Hold first IPT principals meeting	8 Aug 14		
First IPT meeting	15 Sep 14		
Ongoing IPT meetings	Every 2 months		
Technology Roadmap	15 Mar 15 (Draft)		
Requirements Document	15 Mar 15 (Draft)		
Architecture Description	15 May 15 (Draft)		
Project Proposals	1 May 15 (Start)		

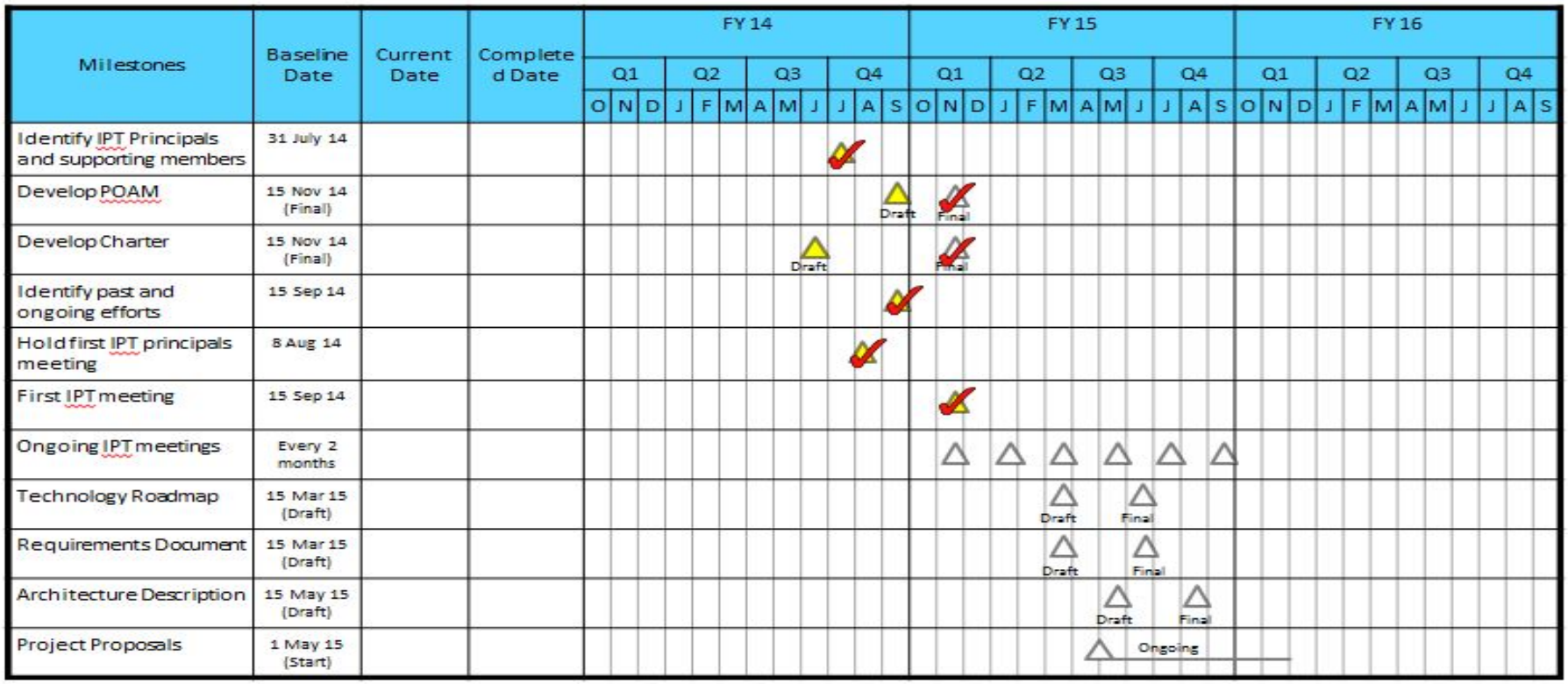
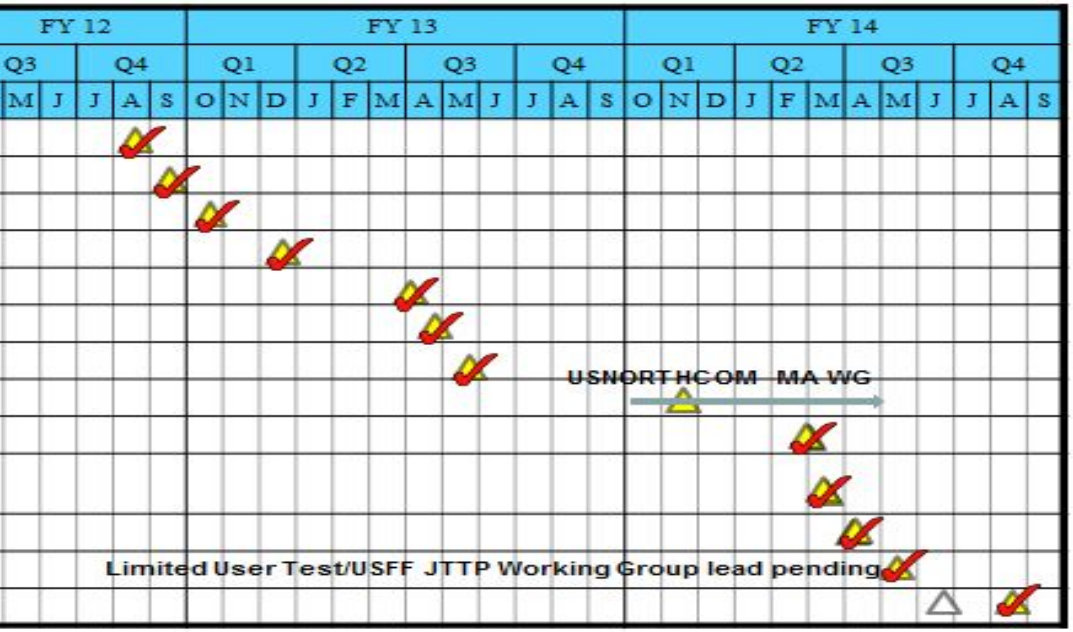


Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Mission Assurance, Threat Alert, Disaster Resiliency and Response (MATADRR) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kick off			08/28/12
Tech Demo - Baseline	09/19/12	09/19/12	09/19/12
Project Management Plan	10/15/12	01/04/13	01/15/13
CONOPS Work Shop	12/06/12	12/06/12	12/06/12
Transition Guide	04/30/13	04/30/13	04/30/13
Annual Project Review	04/30/13	04/30/13	04/30/13
Technical Demo #1	06/25/13	06/25/13	06/25/13
CONEMP Work Shop	09/16/13	11/14/13	N/A
Technical Demo #2	11/15/13	03/03/14	3/14/14
Final Transition Demonstration (FXD)	02/17/14	03/03/14	3/20/14
Transition Decision	6/30/14	4/29/2014	6/17/14
Joint TTPs	6/30/14	N/A	N/A
Final Project Brief	6/16/14	8/20/2014	8/20/2014



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

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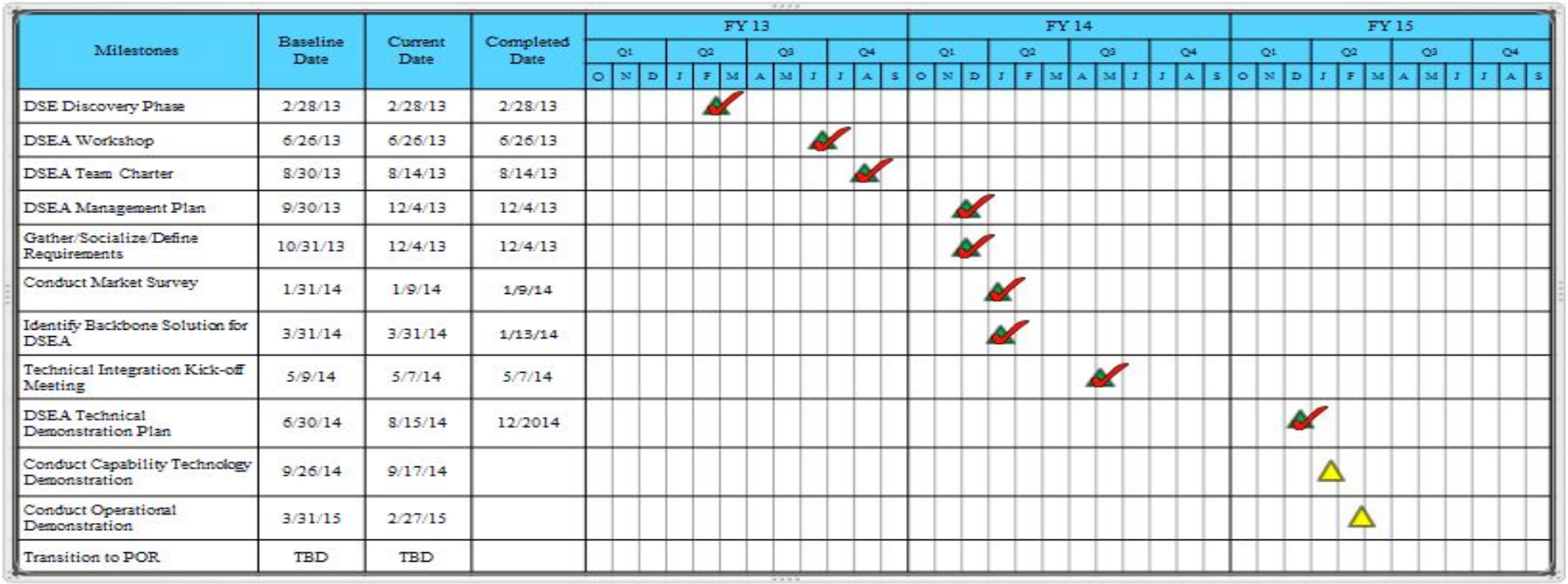
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Defense Security Enterprise Architecture (DSEA) Milestones

Milestones	Baseline Date	Current Date	Completed Date
DSE Discovery Phase	2/28/13	2/28/13	2/28/13
DSEA Workshop	6/26/13	6/26/13	6/26/13
DSEA Team Charter	8/30/13	8/14/13	8/14/13
DSEA Management Plan	9/30/13	12/4/13	12/4/13
Gather/Socialize/Define Requirements	10/31/13	12/4/13	12/4/13
Conduct Market Survey	1/31/14	1/9/14	1/9/14
Identify Backbone Solution for DSEA	3/31/14	3/31/14	1/13/14
Technical Integration Kick-off Meeting	5/9/14	5/7/14	5/7/14
DSEA Technical Demonstration Plan	6/30/14	8/15/14	12/2014
Conduct Capability Technology Demonstration	9/26/14	9/17/14	
Conduct Operational Demonstration	3/31/15	2/27/15	
Transition to POR	TBD	TBD	



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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

UNCLASSIFIED

Continuous Evaluation Concept Demonstration Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13				FY 14				FY 15			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S
CE Interview/Surveys	11/30/2012	07/15/2013	11/30/2012	✓											
CE Workshop	12/11/2012	07/15/2013	12/13/2012		✓										
Working Group Kick-off Meetings	02/12/2012	07/15/2013	02/12/2012			✓									
Acquire Commercial Data for Demo	07/31/2013	07/31/2013	09/09/2013				✓								
Software/Hardware Installed at DMDC		07/09/2014	09/09/2013				✓								
Stand-up Analytical Cell		07/09/2014	10/10/2013					✓							
Initial System Integration Testing		07/09/2014	04/22/2014							✓					
Population Sets for Demo	05/11/2013	12/19/2013											△	DMDC working Vendor System Interface Agreement	
SORN Legal Review	10/01/2013	1/31/2014											△	SORN at OMB; pending approval	
CE CONOPS Legal/Privacy Review	05/29/2013	04/09/2014											△		

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

UNCLASSIFIED

Continuous Evaluation Concept Demonstration Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13												FY 14												FY 15											
				Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Ops Demo	1/10/2014	1/10/2014																																					
Transition	5/15/2014	5/15/2014																																TBD					
Final Report Submitted	7/31/2015	7/31/2015																																TBD					

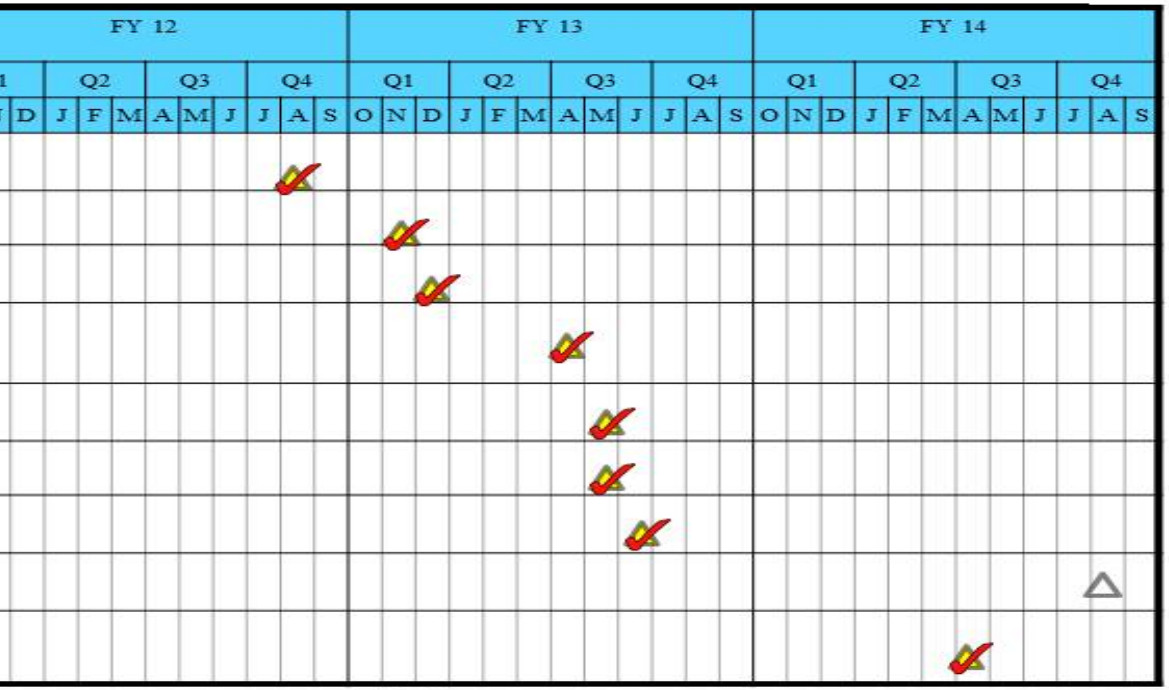
UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Defense Installation Access Control Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kickoff Meeting Completed	08/08/2012	08/08/2012	08/08/2012
Sys Integration Test 1	11/26/2012	11/26/2012	11/26/2012
JCTD Management Plan Submitted	12/05/2013	12/05/2013	12/05/2013
DIAC CONOPS to RFO	04/05/2013	04/05/2013	04/05/2013
Demonstration Execution Document Complete	05/01/2013	05/01/2013	05/01/2013
Sys Integration Test 2	05/30/2013	05/30/2013	05/30/2013
NORTHCOM Test Readiness Review Mtg	06/27/2013	06/27/2013	06/27/2013
RFO Program Review Board	04/15/14	04/15/14	TBD
Base Entry System Test	10/01/13	3/27/14	In Progress



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Defense Installation Access Control Milestones

Milestones	Baseline Date	Current Date	Completed Date
Ops Demo 1	10/28/2013	06/05/2014	06/05/2014
Tech Demo 2	02/17/2014	Unknown	Not Required
Ops Demo 2	04/21/2014	Unknown	10/2014
Transition	08/30/2014	08/30/2014	TBD
Final Report Submitted	08/30/2014	08/30/2014	

FY 12						FY 13												FY 14												FY15					
Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2		
A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M

PSEP Milestones:
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- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

PNAF Transport Container Milestones

Milestones	Baseline Date	Current Date	Completed Date
Developed Project Plan	07 Feb 13	07 Feb 13	27 Mar 13
Developed Container Analysis	25 Feb 13	25 Feb 13	20 Sep 13
Developed Initial Container Design	23 Sep 13	23 Sep 13	07 Jan 14
Phase I final Milestone Review	06 Feb 14	06 Feb 14	06 Feb 14
Initiate Phase II funding Received	06 June 06	06 June 06	06 June 06
Produce Prototype	31 Oct 14		

FY 13: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)
FY 14: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)
FY 15: Q1 (O N D) Q2 (J F M) Q3 (A M J) Q4 (J A S)

PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

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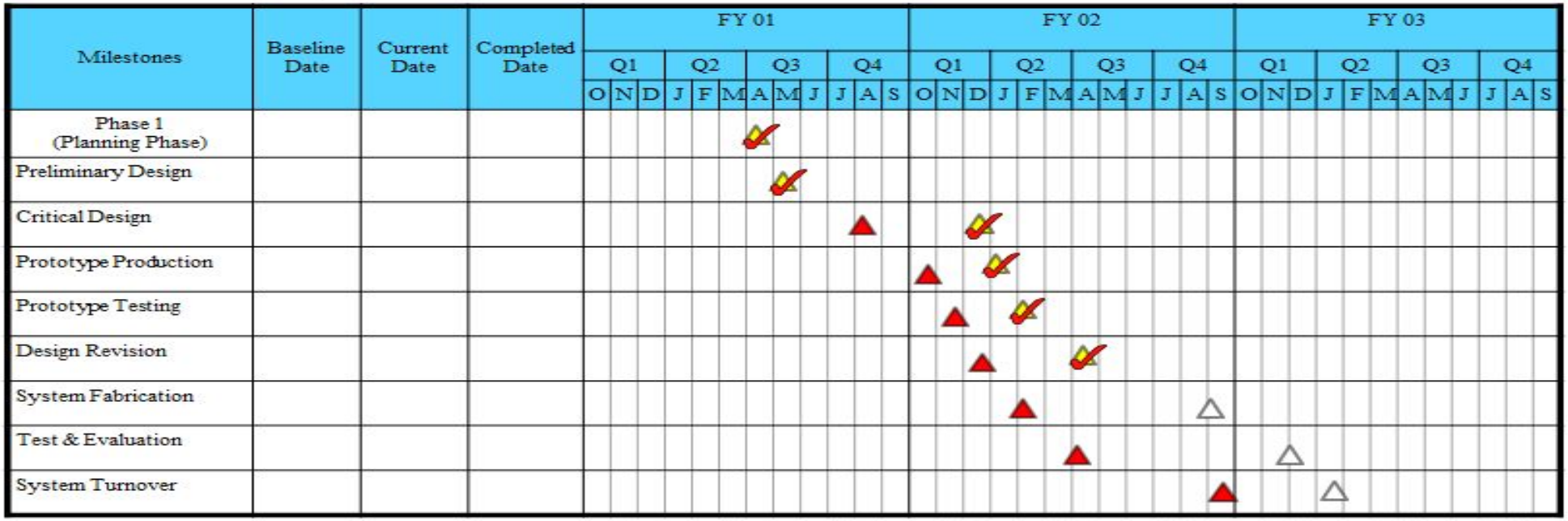
Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Missile Field Defense Force Command, Control, Communications and Situational Awareness



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Missile Field Defense Force Command, Control, Communications and Situational Awareness

Milestones	Baseline Date	Current Date	Completed Date	FY 01				FY 02				FY 03			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S
Phase 1 (Planning Phase)						✓									
Preliminary Design						✓									
Critical Design							▲		✓						
Prototype Production								▲	✓						
Prototype Testing								▲		✓					
Design Revision									▲		✓				
System Fabrication										▲			△		
Test & Evaluation											▲		△		
System Turnover										Today	▲		△		

PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P162 / *Nuclear and Conventional Physical Security*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Integrated Ground Security, Surveillance and Response Capability				
Integrated Ground Security, Surveillance and Response Capability	1	2014	2	2015
Secure Transportable Maintenance System Safe Internal Delay Capability				
Secure Transportable Maintenance System Safe Internal Delay Capability	1	2014	4	2015
PNAF Transport Container				
PNAF Transport Container	1	2014	1	2015
Defense Installation Access Control				
Defense Installation Access Control	1	2014	4	2014
Continuous Evaluation Concept Demonstration				
Continuous Evaluation Concept Demonstration	1	2014	4	2014
Defense Security Enterprise Architecture				
Defense Security Enterprise Architecture	1	2014	2	2016
Mission Assurance, Threat Alert, Disaster Resiliency and Response				
Mission Assurance, Threat Alert, Disaster Resiliency and Response	1	2014	4	2014
Navy Spike Weapon System EO Seeker Upgrade				
Navy Spike Weapon System EO Seeker Upgrade	1	2014	4	2014
Standoff Weapons Defeat IPT				
Standoff Weapons Defeat IPT	1	2014	4	2016
Radar Assisted Area Protection				
Radar Assisted Area Protection	1	2014	4	2017
Foliage Penetration Technology Evaluation				

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Foliage Penetration Technology Evaluation	1	2014	2	2017
Marine Mammal Enhanced Interdiction				
Marine Mammal Enhanced Interdiction	1	2014	3	2015
Marine Mammal Vigilance Localization				
Marine Mammal Vigilance Localization	1	2014	4	2014
Integrated Waterside Security – Concept Demonstration				
Integrated Waterside Security – Concept Demonstration	1	2014	4	2014
Ground-Based Operational Surveillance System (Expeditionary)				
Ground-Based Operational Surveillance System (Expeditionary)	1	2014	4	2015
Missile Field Defense Force C3 Situational Awareness				
Missile Field Defense Force C3 Situational Awareness	1	2014	2	2016

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	Project (Number/Name) P041 / *CNT Rad/Nuc Passive Defense ADC&P*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P041: *CNT Rad/Nuc Passive Defense ADC&P*	1.927	0.000	0.000	0.000	-	0.000	1.187	0.556	2.149	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project establishes a Defense-wide Countering Nuclear Threats (CNT) Materiel development Program. The CNT acquisition strategy directly applies to a Joint requirement for CNT materiel development and addresses the materiel and sustainment gaps for general purpose Joint Forces, including the US Army 20th Support Command and Navy Visit, Board, Search, and Seizure, as well as the Technical Support Groups; NIMBLE ELDER and the US Special Operations Command where required.

B. Accomplishments/Planned Programs ($ in Millions)

N/A

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The program performance metrics are established/approved through the Countering Nuclear Threats Program Manager. The cost, schedule and technical progress is reviewed on a quarterly basis. Performance variances are addressed and corrective action(s) is(are) implemented as necessary.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Personal Dosimeter	Sub Allot	Joint Product Manager - Rad / Nuc Defense : Aberdeen, MD	1.247	-		-		-		-		-	-	-	-
Radiological Detection System	Sub Allot	Joint Product Manager - Rad / Nuc Defense : Aberdeen, MD	0.680	-		-		-		-		-	-	-	-
		Subtotal	1.927	-		-		-		-		-	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.927	-		0.000		-		-		-	-	-	-

Remarks

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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13				FY 14				FY 15 (cont'd on next chart)			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S
Project Initiation / Kick-off Meeting			Jan 2013		✓										
IMS/IMP	July 2013	July 2013	July 2013				✓								
Market Survey	July 2013	July 2013	July 2013				✓								
RMA Report	Sept 2013	Nov 2013	Nov 2013					✓							
Acquisition Decision Memorandum	Sept 2013	Nov 2013	Nov 2013					✓							
Phase 1 Close-out	Oct 2013	Oct 2013	Oct 2013					✓							
Performance Specification and RFP release	Nov 2013	Aug 2014	Aug 2014								✓				
Contract Award	Mar 2014	Dec 2014										△			
Final Requirements Review	Nov 2013	Dec 2014											△		

PSEP Milestones:
- Completion of major phases, task items, or deliverables
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- Demonstrations/Events (Please provide start/end dates as depicted)
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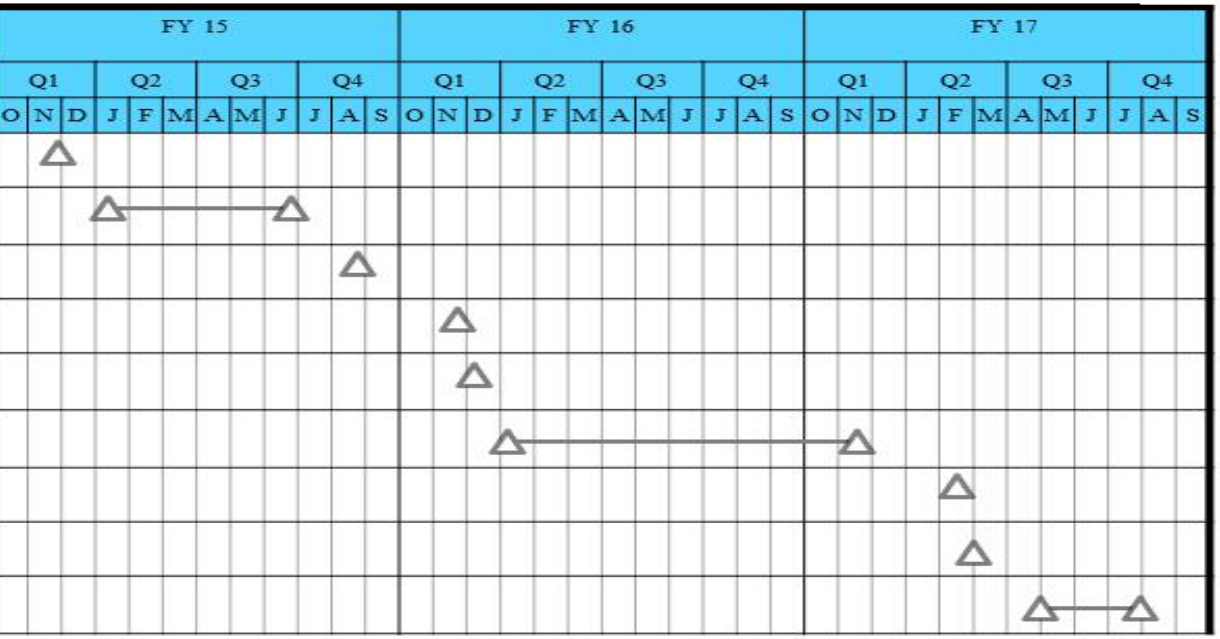
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Phase 2 Close-out	Jun 2014	Nov 2014	
Contractor development + Ctr testing	Jun 2014	Jan 2015 (start)	
Critical Design Reviews	Jan 2015	Aug 2015	
Test Article Deliveries	Feb 2015	Nov 2015	
Phase 3 Close-out	Mar 2015	Dec 2015	
Developmental Testing and OA conducted	Mar 2015	Jan 2016 (start)	
Test Report	Mar 2016	Feb 2017	
Phase 4 Close-out	Mar 2016	Feb 2017	
LRIP Option Award and build	May 2016	Apr 2017 (start)	



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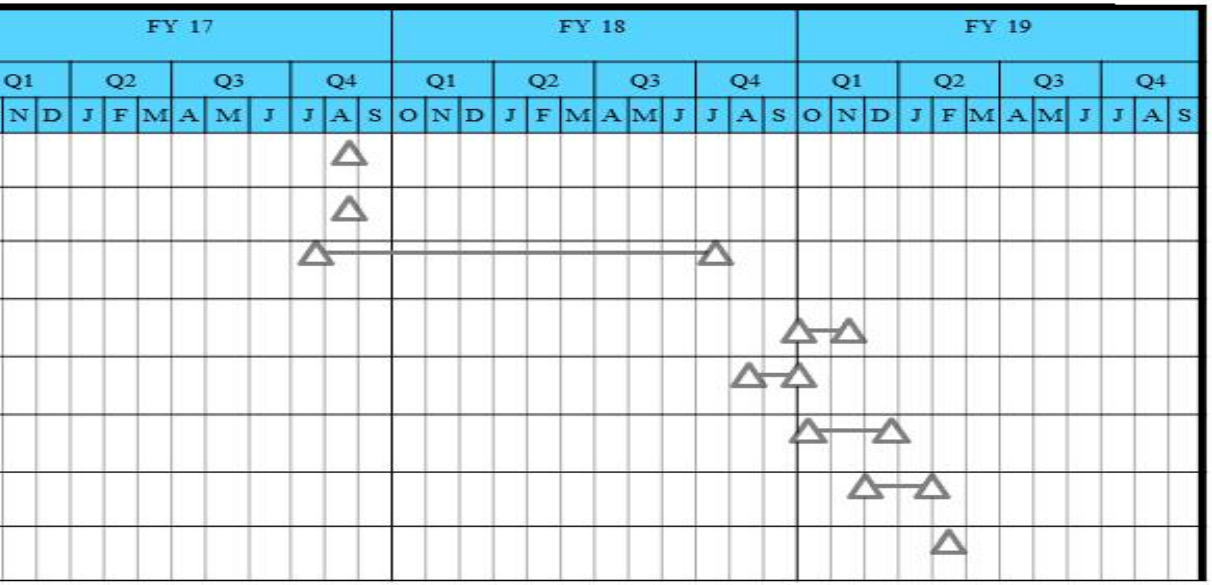
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
LRIP Units delivered	Mar 2017	Aug 2017	
Phase 5 Close-out	Apr 2017	Aug 2017	
First Article Test Planning and Test	May 2017	Jul 2017 (start)	
Log Demo (including training) conducted	Jul 2017	Sep 2018 (start)	
MOT&E (including training) conducted	Oct 2017	Aug 2018 (start)	
FRP OTA Evaluation report	May 2018	Oct 2018 (start)	
JILA Report	Feb 2018	Nov 2018 (start)	
FRP Decision	Jun 2018	Feb 2019	



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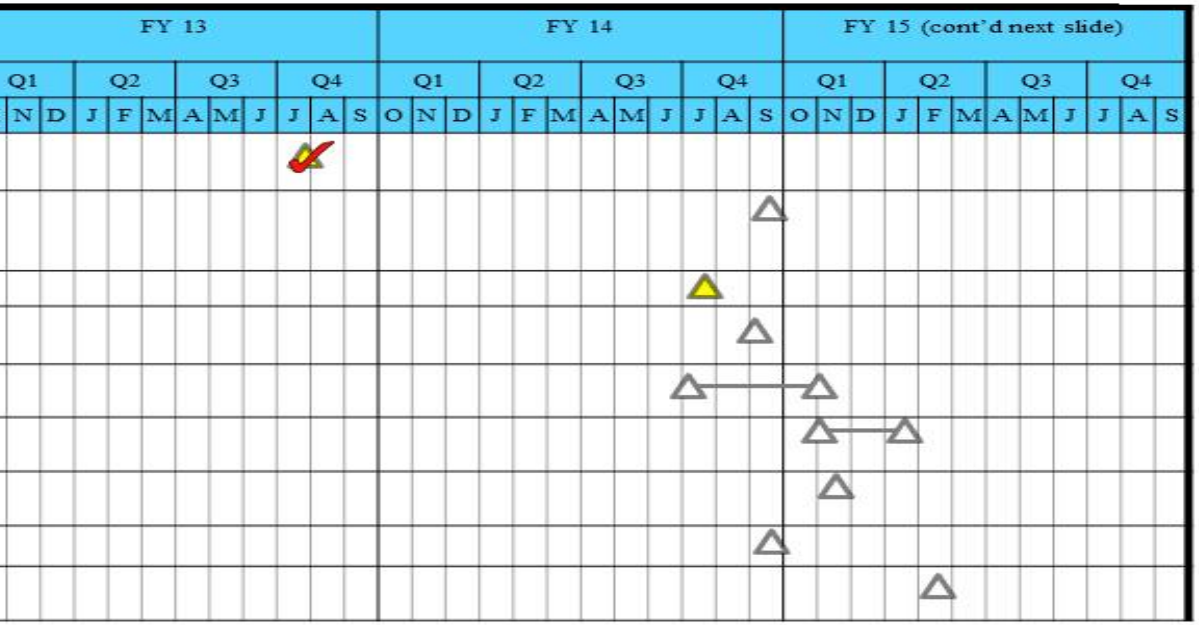
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			July 2013
Navy Battlefield Dosimeter System Contract Award	Mar 2014	Sep 2014	
IMS/IMP	Jan 2013	Jul 2014	
Performance Specification	Mar 2014	Sep 2014	
Installation Study	Apr 2014 (start)	July 2014 (start)	
NVLAP Accreditation	May 2014 (start)	Nov 2014 (start)	
Phase 2 Close-out	May 2014	Nov 2014	
Critical Design Review	July 2014	Sep 2014	
Phase 1 Close-out	Dec 2014	Feb 2015	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

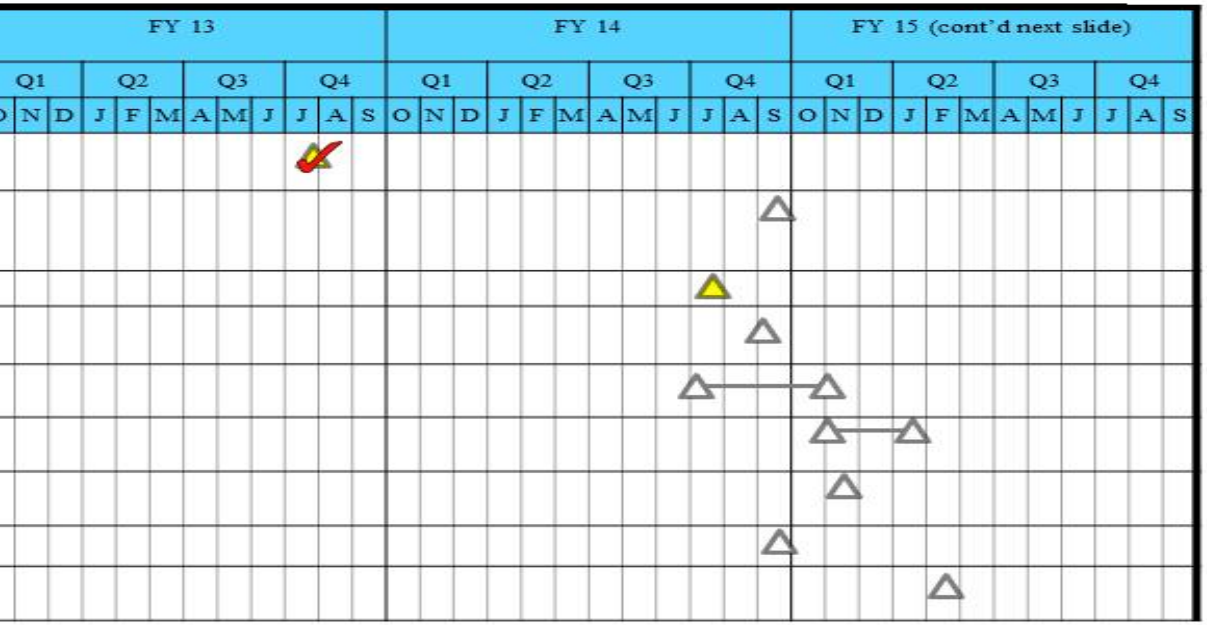
Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P041 / *CNT Rad/Nuc Passive Defense ADC&P*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			July 2013
Navy Battlefield Dosimeter System Contract Award	Mar 2014	Sep 2014	
IMS/IMP	Jan 2013	Jul 2014	
Performance Specification	Mar 2014	Sep 2014	
Installation Study	Apr 2014 (start)	July 2014 (start)	
NVLAP Accreditation	May 2014 (start)	Nov 2014 (start)	
Phase 2 Close-out	May 2014	Nov 2014	
Critical Design Review	July 2014	Sep 2014	
Phase 1 Close-out	Dec 2014	Feb 2015	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
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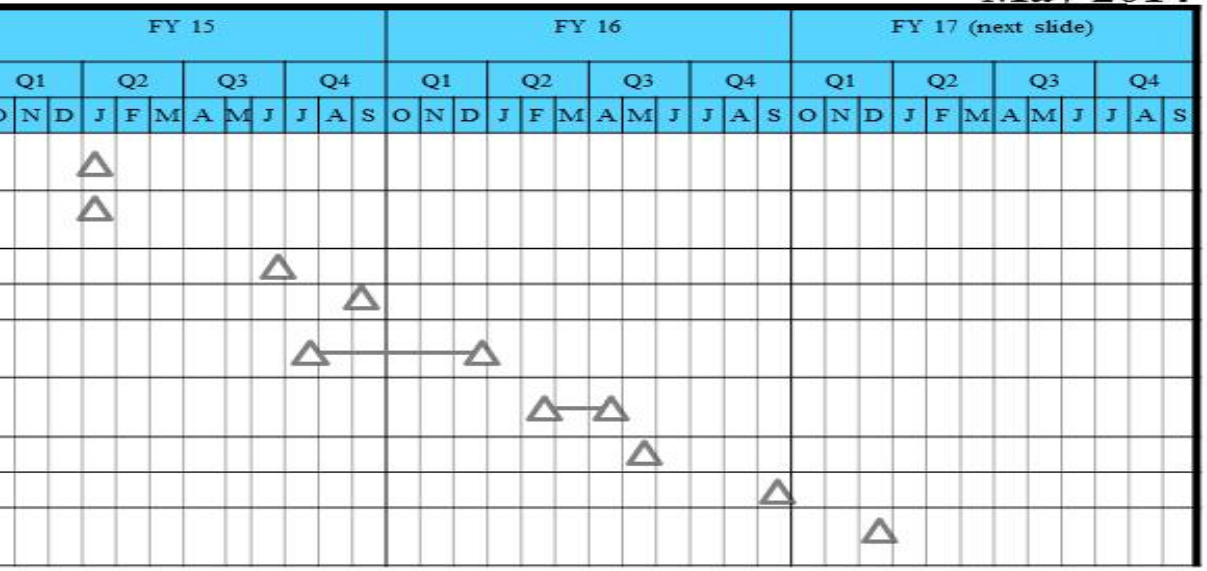
Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P041 / *CNT Rad/Nuc Passive Defense ADC&P*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

May 2014

Milestones	Baseline Date	Current Date	Completed Date
System Verification Review	July 2015	Jan 2015	
Functional Configuration Audit	Mar 2016	Jan 2015	
JPD MS C	Oct 2016	Jun 2015	
Phase 3 Close-out	Sep 2015	Sep 2015	
Product Qualification Testing	Dec 2016 (start)	Jul 2015 (start)	
IOT&E	July 2016 (start)	Feb 2016 (start)	
Log Demo	Sep 2016	May 2016	
JILA Memo	Feb 2017	Sep 2016	
Full Rate Production Decision	Apr 2017	Dec 2017	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
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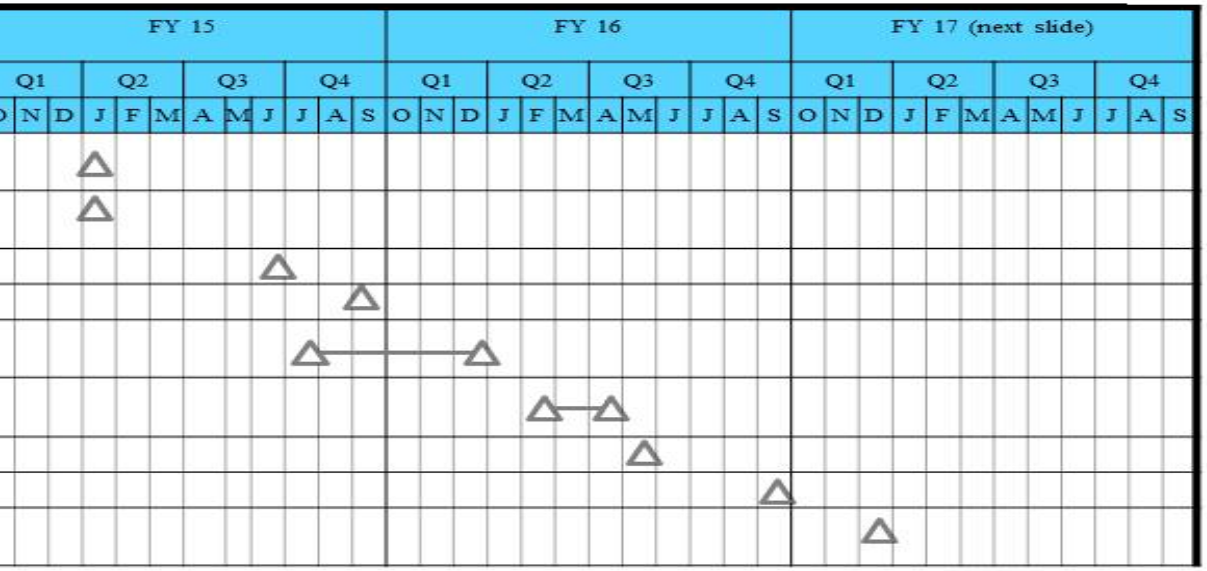
Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P041 / *CNT Rad/Nuc Passive Defense ADC&P*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
System Verification Review	July 2015	Jan 2015	
Functional Configuration Audit	Mar 2016	Jan 2015	
JPD MS C	Oct 2016	Jun 2015	
Phase 3 Close-out	Sep 2015	Sep 2015	
Product Qualification Testing	Dec 2016 (start)	Jul 2015 (start)	
IOT&E	July 2016 (start)	Feb 2016 (start)	
Log Demo	Sep 2016	May 2016	
JILA Memo	Feb 2017	Sep 2016	
Full Rate Production Decision	Apr 2017	Dec 2017	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P041 / *CNT Rad/Nuc Passive Defense ADC&P*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Radiological Detection System				
Radiological Detection System	1	2014	2	2019
Joint Personal Dosimeter				
Joint Personal Dosimeter	4	2014	1	2017

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	Project (Number/Name) P040 / *National Technical Nuclear Forensics Systems*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P040: *National Technical Nuclear Forensics Systems*	21.428	12.191	3.344	0.963	-	0.963	1.385	1.652	0.935	1.216	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Nuclear forensics is the thorough collection, analysis and evaluation of radiological and nuclear material in a pre-detonation state and post-detonation radiological or nuclear materials, devices and debris, as well as the immediate effects created by a nuclear detonation. The ability to identify the source of nuclear material from radioactive debris is critical to our national defense and security. Swift and accurate forensic and attribution (identification) capabilities are vital to developing an appropriate national response to a nuclear event and preventing future attacks in a timely manner.

Nuclear terrorism is one of the most significant and pressing threats identified by national leadership. A credible nuclear forensics program is essential to preventing nuclear terrorism by deterring nations from sponsoring nuclear terrorism. During the Deputy Management Advisory Group process shortfalls and resources to close these gaps were identified and supported by the Deputy Secretary of Defense. The purpose of this program is to develop systems such as ground based prompt diagnostic systems and airborne sample collection systems to provide timely and accurate information to national leadership in the area of nuclear forensics.

Per DoDD 2060.04 OSD AT&L NCB provides guidance and direction for the implementation of the Department of Defense National Technical Nuclear Forensics program. NCB represents DoD interests in all areas of nuclear forensics but emphasizes post-detonation applications due to Presidential guidance assigning the department the lead role in develop, providing, and maintaining post-detonation nuclear forensics capability.

This PE can fund travel to support the requirements of this program.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: National Technical Nuclear Forensics Systems	12.191	3.344	0.963
Description: Advanced development of ground based prompt diagnostic and airborne collection systems. This technology will provide new information that increases accuracy and provides an improved timeline in support of senior leadership decision making.			
FY 2015 Accomplishments: • Completed installation of prototype prompt diagnostics systems at eleven sites in Metropolitan Area B and two sites in Metropolitan Area C. Completed manufacturing and testing of all prototype prompt diagnostics systems for Metropolitan Area C.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P040 / *National Technical Nuclear Forensics Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Completed contract for manufacturing one complete Harvester Particulate Airborne Collection System (PACS). Developed DOTmLPF-P Change Request (DCR) for Harvester PACS to support platform assignment. Initiated feasibility study of Harvester PACS on additional platform. ***FY 2016 Plans:*** • Complete installation of prototype prompt diagnostics systems in Metropolitan Areas B & C. Develop and test prototype prompt diagnostics systems for testbed use. Continue testing and operational support and integration of prototype ground-based prompt diagnostic systems and install in one additional city. • Procure platform-specific mounting systems to enable operation of Harvester PACS on DCR-designated platform. Continue research for modular air sample collection systems to support National Technical Nuclear Forensics and augment treaty verification capabilities. ***FY 2017 Plans:*** • Transition operational support and integration of ground-based prompt diagnostic systems to the Air Force for strategic implementation in key metropolitan areas. • Continue Harvester PACS operational support of a modular particulate air sampling capability that augments the Department of Defense mobile nuclear air sampling capability to support collection requirements for treaty verification and National Technical Nuclear Forensics.			
Accomplishments/Planned Programs Subtotals	12.191	3.344	0.963

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The program performance metrics are established/approved through the Countering Nuclear Threats Program Manager. The cost, schedule and technical progress is reviewed on a quarterly basis. Performance variances are addressed and corrective action(s) is(are) implemented as necessary. This is new program focusing on advanced development to meet critical needs.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	Project (Number/Name) P040 / *National Technical Nuclear Forensics Systems*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DISCREET OCULUS / United States Prompt Diagnostics System	Sub Allot	Defense Threat Reduction Agency : Ft. Belvoir, VA	12.500	6.517		-		0.000		-		0.000	-	-	-
Modular Whole Air Collection System	Sub Allot	Air Force Technical Applications Center : Patrick AFB, FL	0.750	0.000		-		-		-		-	-	-	-
Particular Airborne Collection System	Sub Allot	Air Force Technical Applications Center : Patrick AFB, FL	5.271	5.463		3.344		0.743		-		0.743	-	-	-
Global Initiative Information Portal	IA	Department of State : Washington, DC	0.656	-		-		-		-		-	-	-	-
SOCOM Render Safe	Various	Multiple performers : Multiple locations	1.951	-		-		-		-		-	-	-	-
		Subtotal	21.128	11.980		3.344		0.743		-		0.743	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Nuclear Testing, Diagnostics, Forensics and Stockpile Stewardship Course	IA	Lawrence Livermore National Laboratory : Livermore, CA	0.300	0.098		-		0.200		-		0.200	-	-	-
IDA - CNT Goals & Approaches	Allot	IDA : Alexandria, VA	-	0.093		-		-		-		-	-	-	-
Travel	MIPR	AFTAC : Washington, DC	-	0.020		-		0.020		-		0.020	-	-	-
		Subtotal	0.300	0.211		-		0.220		-		0.220	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P040 / *National Technical Nuclear Forensics Systems*	

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	21.428	12.191		3.344		0.963		-		0.963	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P040 / *National Technical Nuclear Forensics Systems*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Build and Deploy DISCREET OCULUS Sensor Systems

Milestones	Baseline Date	Current Date	Completed Date	FY 15												FY 16												FY 17											
				Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Metropolitan Area B Installation Complete	Dec 30 2014	Mar 30 2016																			▲																		
Metropolitan Area C Installation Complete	April 30 2016	Dec 30 2016																													▲								
T&E Sensor Suites Fabrication	Jan 30 2016	Mar 30 2016																			▲																		

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P040 / *National Technical Nuclear Forensics Systems*

Particulate Airborne Collection System and Modular Whole-air Collection System Timeline

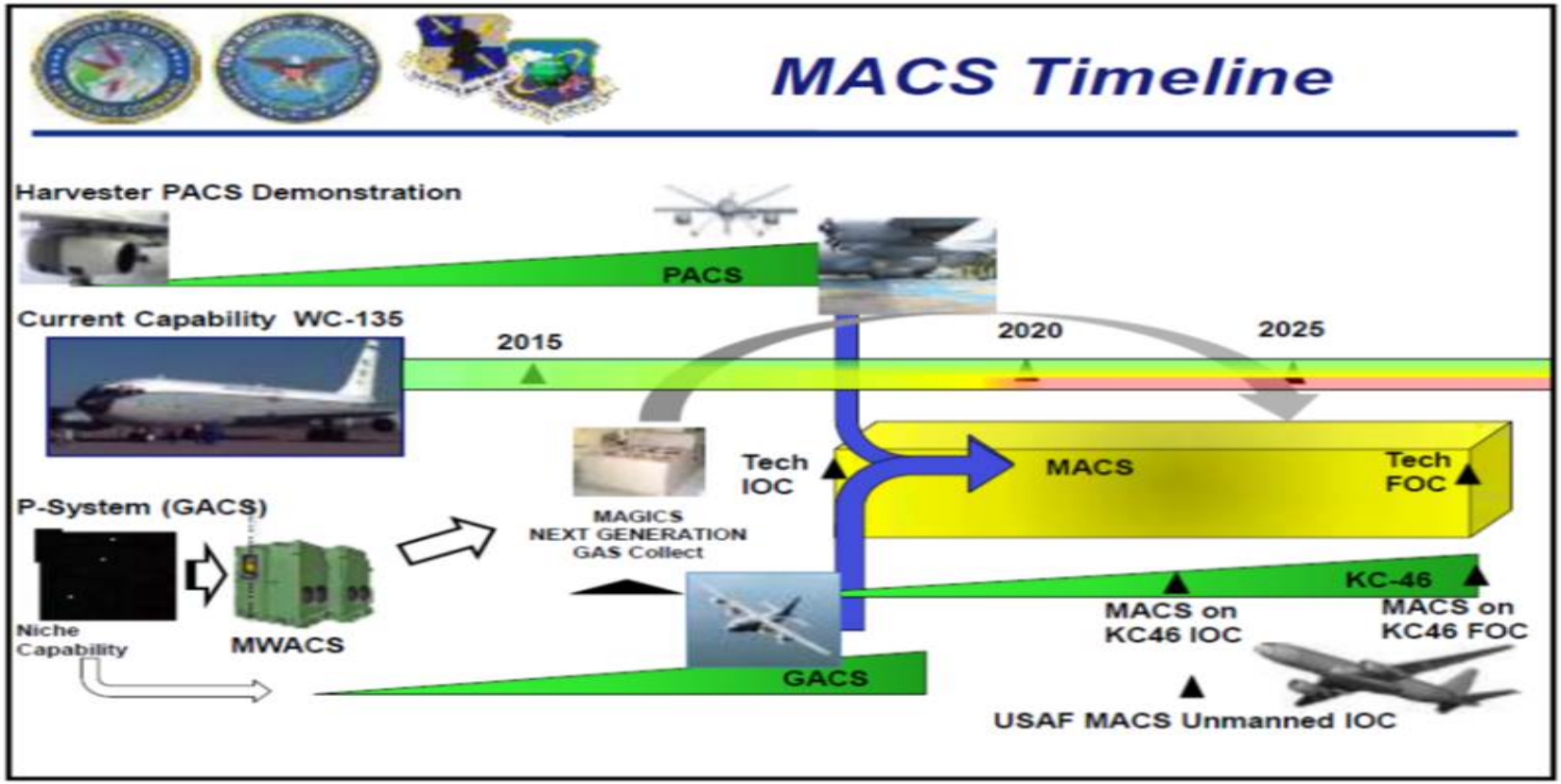


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P040 / *National Technical Nuclear Forensics Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
DISCREET OCULUS				
DISCREET OCULUS	1	2014	3	2016
Harvester Particulate Airborne Collection System				
Harvester Particulate Airborne Collection System	1	2014	1	2017
Modular Whole Air Collection System				
Modular Whole Air Collection System	1	2014	1	2016

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603600D8Z / *WALKOFF*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	63.988	98.547	90.387	89.643	-	89.643	96.482	101.539	102.876	104.857	Continuing	Continuing
600: *WALKOFF*	63.988	98.547	90.387	89.643	-	89.643	96.482	101.539	102.876	104.857	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Classified.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	90.558	90.567	86.990	-	86.990
Current President's Budget	98.547	90.387	89.643	-	89.643
Total Adjustments	7.989	-0.180	2.653	-	2.653
• Congressional General Reductions	-	-0.180			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.000	-			
• SBIR/STTR Transfer	-2.301	-			
• Departmental Adjustment	10.290	-	2.653	-	2.653

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: WALKOFF	98.547	90.387	89.643
FY 2015 Accomplishments: Classifed.			
FY 2016 Plans: Classifed.			
FY 2017 Plans: Classified.			
Accomplishments/Planned Programs Subtotals	98.547	90.387	89.643

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603600D8Z / *WALKOFF*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0603600D8Z O&M DW: *WALKOFF*	0.000	6.310	2.619	-	2.619	2.852	2.835	2.865	2.921	Continuing	Continuing

Remarks

E. Acquisition Strategy

Classified.

F. Performance Metrics

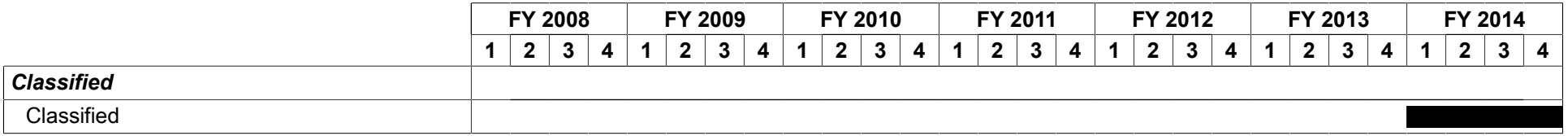
Classified.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603600D8Z / *WALKOFF*	**Project (Number/Name)** 600 / *WALKOFF*

Remarks

Classified.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603600D8Z / *WALKOFF*	**Project (Number/Name)** 600 / *WALKOFF*



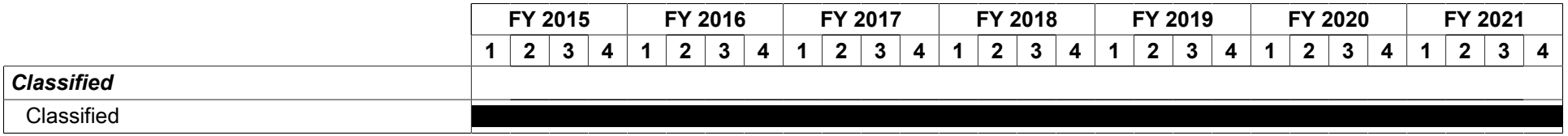


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603600D8Z / *WALKOFF*	**Project (Number/Name)** 600 / *WALKOFF*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Classified				
Classified	1	2014	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603714D8Z / *Advanced Sensors Application Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	19.190	19.482	15.869	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
714: *Advanced Sensors Application Program*	19.190	19.482	15.869	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Sensors Application Program (ASAP) focuses on continued investigations of foreign technologies in Anti-Submarine Warfare (ASW). In coordination with an international partner, unique and innovative approaches are used to understand foreign capabilities and threats to US forces.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	19.490	15.900	16.470	-	16.470
Current President's Budget	19.482	15.869	0.000	-	0.000
Total Adjustments	-0.008	-0.031	-16.470	-	-16.470
• Congressional General Reductions	-	-0.031			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-0.008	-	-16.470	-	-16.470

Change Summary Explanation

Funded by Navy starting in FY2017.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Advanced Sensors Application Program	19.482	15.869	-
FY 2015 Accomplishments: Provided Mission Support (Details provided in Defense-Wide classified book).			
FY 2016 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603714D8Z / *Advanced Sensors Application Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Will provide Mission Support (Details provided in Defense-Wide classified book).			
Accomplishments/Planned Programs Subtotals	19.482	15.869	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Details provided in Defense-Wide classified book.

F. Performance Metrics

Numbers of operational field demonstrations; actual/in-kind resource sharing differential among participating entities; studies produced; successful anomaly detections; false-positive results; and technology transfers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603714D8Z / *Advanced Sensors Application Program*	Project (Number/Name) 714 / *Advanced Sensors Application Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Research Development	Option/ FP	Various : Various	19.187	18.868		14.858		0.000		-		0.000	-	-	-
		Subtotal	19.187	18.868		14.858		0.000		-		0.000	-	-	-

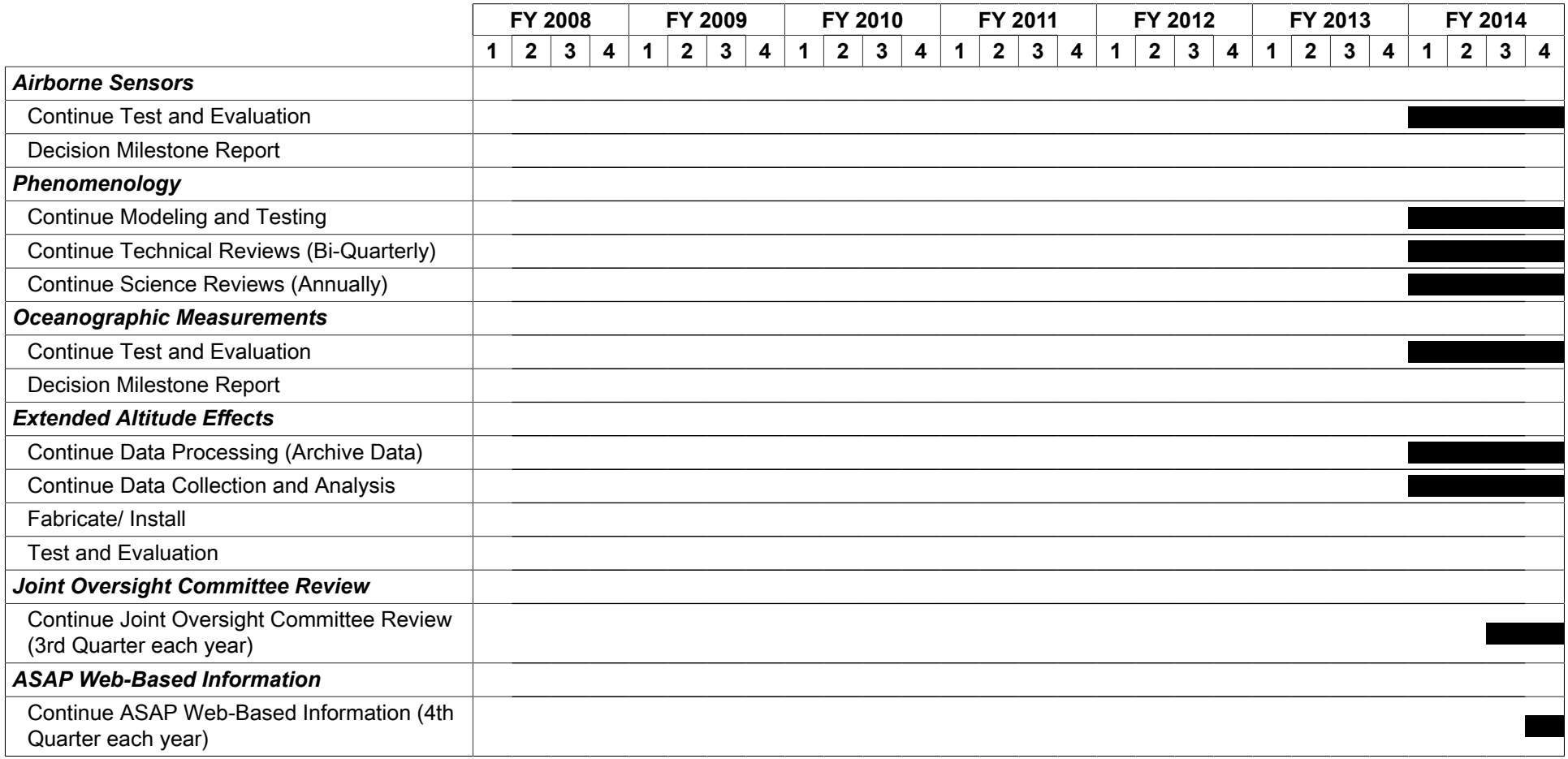
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	Option/ FFP	MITRE : Falls Church VA	0.003	0.614		1.011		-		-		-	-	-	-
		Subtotal	0.003	0.614		1.011		-		-		-	-	-	-

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	19.190	19.482		15.869		0.000		-		0.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603714D8Z / *Advanced Sensors Application Program*	**Project (Number/Name)** 714 / *Advanced Sensors Application Program*



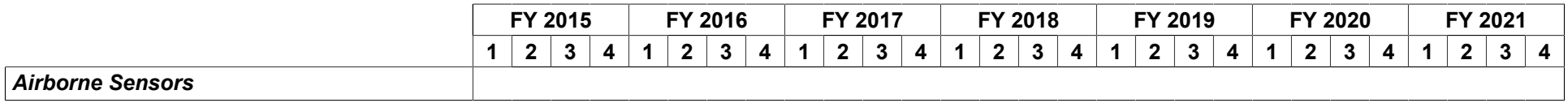


Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603714D8Z / *Advanced Sensors Application Program*	**Project (Number/Name)** 714 / *Advanced Sensors Application Program*

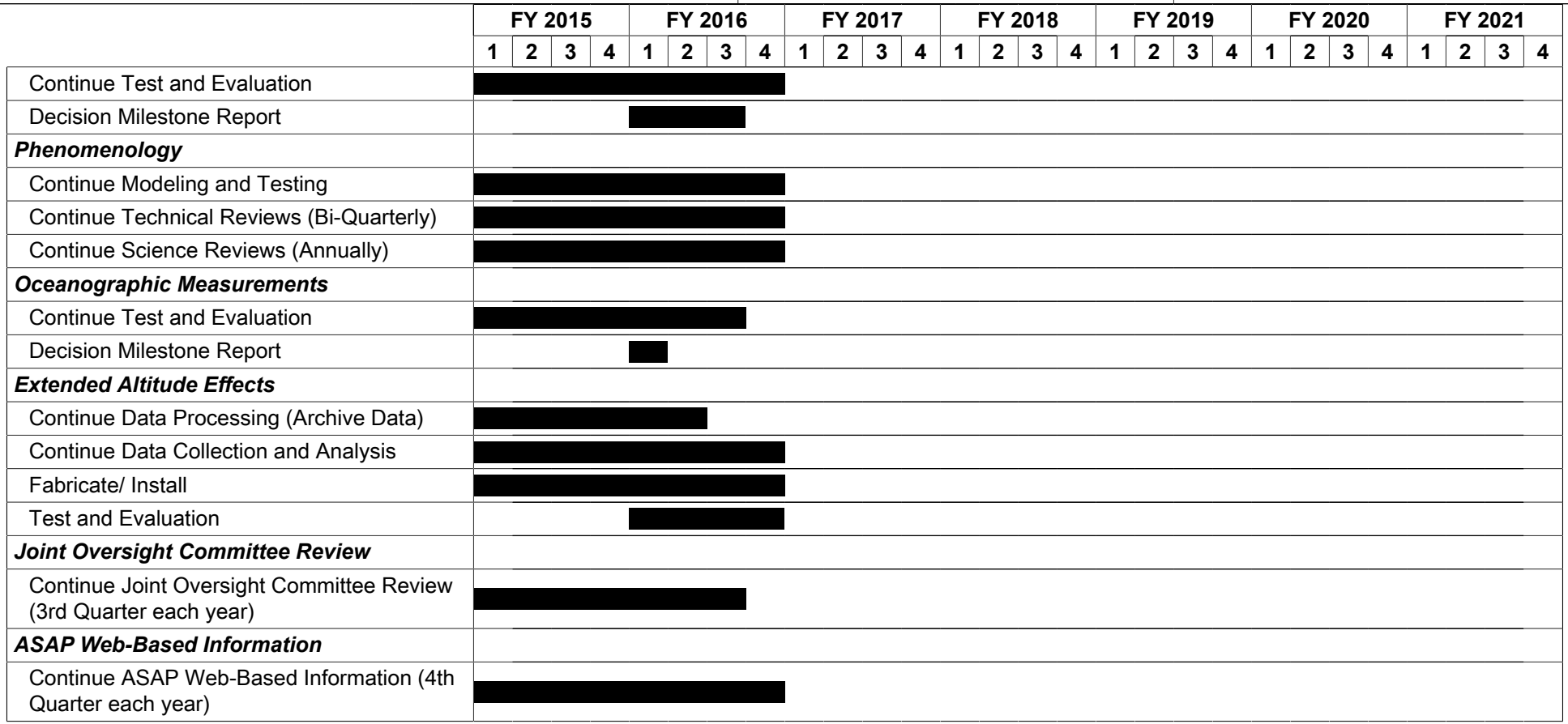


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603714D8Z / *Advanced Sensors Application Program*	**Project (Number/Name)** 714 / *Advanced Sensors Application Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Airborne Sensors				
Continue Test and Evaluation	1	2014	4	2016
Decision Milestone Report	1	2016	3	2016
Phenomenology				
Continue Modeling and Testing	1	2014	4	2016
Continue Technical Reviews (Bi-Quarterly)	1	2014	4	2016
Continue Science Reviews (Annually)	1	2014	4	2016
Oceanographic Measurements				
Continue Test and Evaluation	1	2014	3	2016
Decision Milestone Report	1	2016	1	2016
Extended Altitude Effects				
Continue Data Processing (Archive Data)	1	2014	2	2016
Continue Data Collection and Analysis	1	2014	4	2016
Fabricate/ Install	1	2015	4	2016
Test and Evaluation	1	2016	4	2016
Joint Oversight Committee Review				
Continue Joint Oversight Committee Review (3rd Quarter each year)	3	2014	3	2016
ASAP Web-Based Information				
Continue ASAP Web-Based Information (4th Quarter each year)	4	2014	4	2016

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603821D8Z / *Acquisition Enterprise Data & Information Services*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	2.136	-	2.136	2.215	2.547	3.131	4.004	Continuing	Continuing
*P840: *Acquisition Enterprise Data & Information Services*	-	0.000	0.000	2.136	-	2.136	2.215	2.547	3.131	4.004	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a New Start Program.

A. Mission Description and Budget Item Justification

This is a newly assigned Program Element for FY2017. Acquisition Enterprise Data & Information Services will provide acquisition data analytics to support the Defense Acquisition Executive (DAE), OSD senior leaders, and OSD and Component analysts who assess the effectiveness of the Department's Major Defense Acquisition Programs, Major Automated Information Systems, and other acquisition programs. Acquisition Enterprise Data & Information Services will support the DAE's responsibilities by providing critical information for acquisition analysis, oversight, and decision making (Big Data Analytics). Advanced component development and prototyping efforts will focus on integrating acquisition data stored across multiple disparate data sets and systems to deliver a centrally accessible collection of tools, acquisition data analysis capabilities, data access services, and data standards. These efforts will enhance acquisition visibility through the definition, development, and fielding of concepts and tools for Department-wide data analysis for use by Congress and the Department, particularly in support of the DAE.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	2.136	-	2.136
Total Adjustments	0.000	0.000	2.136	-	2.136
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Funding for New Program in FY 2017	-	-	2.136	-	2.136

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: *P840: *Acquisition Enterprise Data & Information Services*		

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603821D8Z / *Acquisition Enterprise Data & Information Services*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Congressional Add: *Not Applicable*	0.000	0.000
Congressional Add Subtotals for Project: *P840	0.000	0.000
Congressional Add Totals for all Projects	0.000	0.000

Change Summary Explanation

No significant program changes. This is a new start program in FY 2017.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Acquisition Enterprise Data & Information Services	0.000	0.000	2.136
Description: This effort will provide acquisition data analytics to support the Defense Acquisition Executive (DAE), OSD senior leaders, and OSD and Component analysts to enable them to assess the effectiveness of the Department's Major Defense Acquisition Programs, Major Automated Information Systems, and other acquisition programs. Advanced component development and prototyping efforts will focus on integrating acquisition data stored across multiple disparate data sets and systems to deliver a centrally accessible collection of tools, acquisition data analysis capabilities, data access services, and data standards. ***FY 2015 Accomplishments:*** Not Applicable. No RDT&E funds received in FY15 ***FY 2016 Plans:*** No RDT&E funds received in FY16 ***FY 2017 Plans:*** Advanced component development and prototyping efforts will focus on integrating acquisition data stored across multiple disparate data sets and systems to deliver a centrally accessible collection of tools, acquisition data analysis capabilities, data access services, and data standards. Plans include develoment of the Acquisition Visibility Data Framework and Acquisition Visibility Data Service, creation of a staging environment, code library, conducting unit tests and integration tests, and prototyping of future Acquisition Enterprise Data capabilities.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	2.136

	FY 2015	FY 2016
Congressional Add: Not Applicable	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603821D8Z *I Acquisition Enterprise Data & Information Services*

	FY 2015	FY 2016
FY 2015 Accomplishments: Not Applicable ***FY 2016 Plans:*** Not Applicable		
Congressional Adds Subtotals	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

For efforts in FY2017, advanced component development and prototyping effort acquisitions are planned to be made through a competed small business blanket purchase agreement.

F. Performance Metrics

Metric: Automated testing must cover a minimum of 80% code. Measure: Code Coverage Report
Metric: Developed capabilities must pass testing. Measure: Automated testing results report (unit, integration, functional, etc.) showing pass/fail for each assertion

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603821D8Z / *Acquisition Enterprise Data & Information Services*	Project (Number/Name) *P840 / *Acquisition Enterprise Data & Information Services*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Visibility Blanket Purchase Agreement	C/BPA	To Be Determined : TBD	-	-		-		2.136	Jan 2017	-		2.136	-	-	-
		Subtotal	-	-		-		2.136		-		2.136	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		2.136		-		2.136	-	-	-

Remarks

Advanced component development and prototyping efforts will focus on integrating acquisition data stored across multiple disparate data sets and systems to deliver a centrally accessible collection of tools, acquisition data analysis capabilities, data access services, and data standards. Plans include develoment of the Acquisition Visibility Data Framework and Acquisition Visibility Data Service, creation of a staging environment, code library, conducting unit tests and integration tests, and prototyping of future Acquisition Enterprise Data capabilities.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603821D8Z / *Acquisition Enterprise Data & Information Services*	**Project (Number/Name)** *P840 / *Acquisition Enterprise Data & Information Services*

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NA																												
NA									[redacted]																			

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603821D8Z / *Acquisition Enterprise Data & Information Services*	**Project (Number/Name)** *P840 / *Acquisition Enterprise Data & Information Services*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NA				
NA	1	2017	2	2017

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	194.592	62.432	52.654	52.491	-	52.491	56.771	60.999	61.784	62.952	Continuing	Continuing
P514: *Environmental Security Technology Certification Program*	194.592	62.432	52.654	52.491	-	52.491	56.771	60.999	61.784	62.952	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Environmental Security Technology Certification Program (ESTCP) demonstrates and validates the most promising innovative environmental and energy technologies that target DoD's most urgent needs. Technologies selected are projected to provide a return on the investment through cost savings and improved efficiencies. The program responds to: (1) Congressional concern over the slow pace of remediation of environmentally polluted sites on military installations, (2) Congressional direction to conduct demonstrations specifically focused on emerging new technologies, and (3) the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by environmental restoration, waste management, and the cost of energy. Preference for demonstrations is given to technologies that have successfully completed all necessary research and development objectives, and address the highest priority DoD requirements.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	63.871	52.758	54.496	-	54.496
Current President's Budget	62.432	52.654	52.491	-	52.491
Total Adjustments	-1.439	-0.104	-2.005	-	-2.005
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.025	-0.104			
• SBIR/STTR Transfer	-1.414	-			
• Realignment	-	-	-0.602	-	-0.602
• Economic Assumptions Adjustment	-	-	-0.414	-	-0.414
• Efficiency Reduction	-	-	-0.989	-	-0.989

Change Summary Explanation

Funding realigned to other programs. Other reductions in FY 17 is a result of department efficiency and economic assumptions adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603851D8Z / *Environmental Security Technology Certification Program*	Project (Number/Name) P514 / *Environmental Security Technology Certification Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P514: *Environmental Security Technology Certification Program*	194.592	62.432	52.654	52.491	-	52.491	56.771	60.999	61.784	62.952	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) The Environmental Security Technology Certification Program (ESTCP) demonstrates and validates the most promising innovative environmental and energy technologies that target DoD's most urgent needs. Technologies selected are projected to provide a return on the investment through cost savings and improved efficiencies. The program responds to: (1) Congressional concern over the slow pace of remediation of environmentally polluted sites on military installations, (2) Congressional direction to conduct demonstrations specifically focused on emerging new technologies, and (3) the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by environmental restoration, waste management, and the cost of energy. Preference for demonstrations is given to technologies that have successfully completed all necessary research and development objectives, and address the highest priority DoD requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Environmental Technology Demonstration/Validation	33.317	29.038	29.080
Description: Funds are programmed for investments in projects that address priority DoD environmental requirements. The focus of the program is on live site unexploded ordnance (UXO) discrimination demonstrations, addressing emerging and recalcitrant cleanup issues, range sustainment technologies, and reducing life cycle costs of DoD weapon systems by eliminating hazardous materials. Accomplishments/plans are described for each FY below.			
FY 2015 Accomplishments: Funds were invested in projects that address priority DoD environmental requirements. New investment topics for FY 2015 included: 1) Assessment of Vapor Intrusion from Subsurface Volatile Organic Compound Contamination, 2) Weapons Systems & Platforms Manufacturing and Maintenance, Green Energetics, and Waste Reduction. Funding in FY 2015 also supports live site UXO demonstrations. This initiative will transition innovative technologies that can reduce DoD's military munitions response liabilities by approximately 75% with an expected cost savings of $10 billion. Details are provided at www.serdp-estcp.org.			
FY 2016 Plans: Funds are planned for continued investment in projects that address priority DoD environmental requirements. Focused new investment topics for FY 2016 include: 1) Management of Contaminated Groundwater and 2) Detection, Classification, and Remediation of Military Munitions in Underwater Environments. Details are provided at www.serdp-estcp.org.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*	**Project (Number/Name)** P514 / *Environmental Security Technology Certification Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Funds are planned for continued investment in projects that address priority DoD environmental requirements and new Investments in technology for the most challenging remaining groundwater restoration sites, scale up demonstrations for Underwater Unexploded Ordnance, and demonstrations of environmentally benign surface engineering technology at larger scales.			
Title: Energy Technology Demonstration/Validation ***Description:*** Funds are programmed for investments in energy projects that constitute the Installation Energy Test Bed Initiative. This initiative responds to Congressional direction for the Department to increase energy efficiency, reduce installation energy intensity, increase the use of renewable energy, and improve energy security. Emerging energy technologies offer DoD a cost effective opportunity to meet these requirements on its installations while reducing energy and operational costs. The DoD test bed program validates and tests the operational cost and performance of innovative energy technologies in a real-world integrated building environment so as to reduce risk, overcome the barriers to deployment, and facilitate wide-scale deployment. The test bed program exploits the Department's existing built infrastructure to evaluate energy efficiency and renewable energy technologies under the varied climatic conditions and building types DoD manages. The test bed's key elements are: 1) competitive selection of new technologies, 2) systematic and consistent evaluation to determine performance, operational readiness and life cycle costs, and 3) development of guidance and design information for future deployment across installations. ***FY 2015 Accomplishments:*** Funds were invested in energy projects that constitute the Installation Energy Test Bed Initiative. In FY 2015 ESTCP funded new technology demonstrations in two areas: 1) Energy Efficiency for Military Buildings and 2) Water Conservation and Reuse for Military Facilities. Information on existing demonstrations can be found at www.serdp-estcp.org. ***FY 2016 Plans:*** Funds are planned to continue investments in energy and water projects that constitute the Installation Energy Test Bed Initiative. In FY 2016, ESTCP solicited proposals for funding in two areas: 1) Energy Generation, Storage, Dispatch and Management on Military Installations and 2) Cybersecure Connectivity for Energy System Components and Military Installation Energy Infrastructure. Details are provided at www.serdp-estcp.org. ***FY 2017 Plans:*** Funds are planned to continue investments in energy and water projects that constitute the Installation Energy Test Bed Initiative.	29.115	23.616	23.411
Accomplishments/Planned Programs Subtotals	62.432	52.654	52.491

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*	**Project (Number/Name)** P514 / *Environmental Security Technology Certification Program*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

ESTCP solicits proposals from all DoD organizations, other Federal Agencies, and the commercial sector. Projects are selected based on an annual competitive process through reviews by multi-agency panels.

E. Performance Metrics

Performance in this program is monitored at two levels. At the lowest level, each individual project is measured against technical and financial milestones on a quarterly and annual basis. At a program-wide level, progress is measured against DoD's environmental requirements and the demonstration and transition of technologies that address these requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*	**Project (Number/Name)** P514 / *Environmental Security Technology Certification Program*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Contract	C/IDDQ	HGL : Reston, VA	9.160	2.600		2.496		2.152		-		2.152	Continuing	Continuing	-
		Subtotal	9.160	2.600		2.496		2.152		-		2.152	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy and Water	C/TBD	TBD : TBD	82.795	27.815		22.368		23.411		-		23.411	Continuing	Continuing	-
Weapons Systems and Platforms	C/TBD	TBD : TBD	27.191	9.153		7.743		7.506		-		7.506	Continuing	Continuing	-
Munitions Response	C/TBD	TBD : TBD	21.063	7.370		6.117		6.351		-		6.351	Continuing	Continuing	-
Environmental Restoration	C/TBD	TBD : TBD	34.851	10.270		8.900		8.766		-		8.766	Continuing	Continuing	-
Resource Conservation and Climate Change	C/TBD	TBD : TBD	19.532	5.224		5.030		4.305		-		4.305	Continuing	Continuing	-
		Subtotal	185.432	59.832		50.158		50.339		-		50.339	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	194.592	62.432		52.654		52.491		-		52.491	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*	**Project (Number/Name)** P514 / *Environmental Security Technology Certification Program*

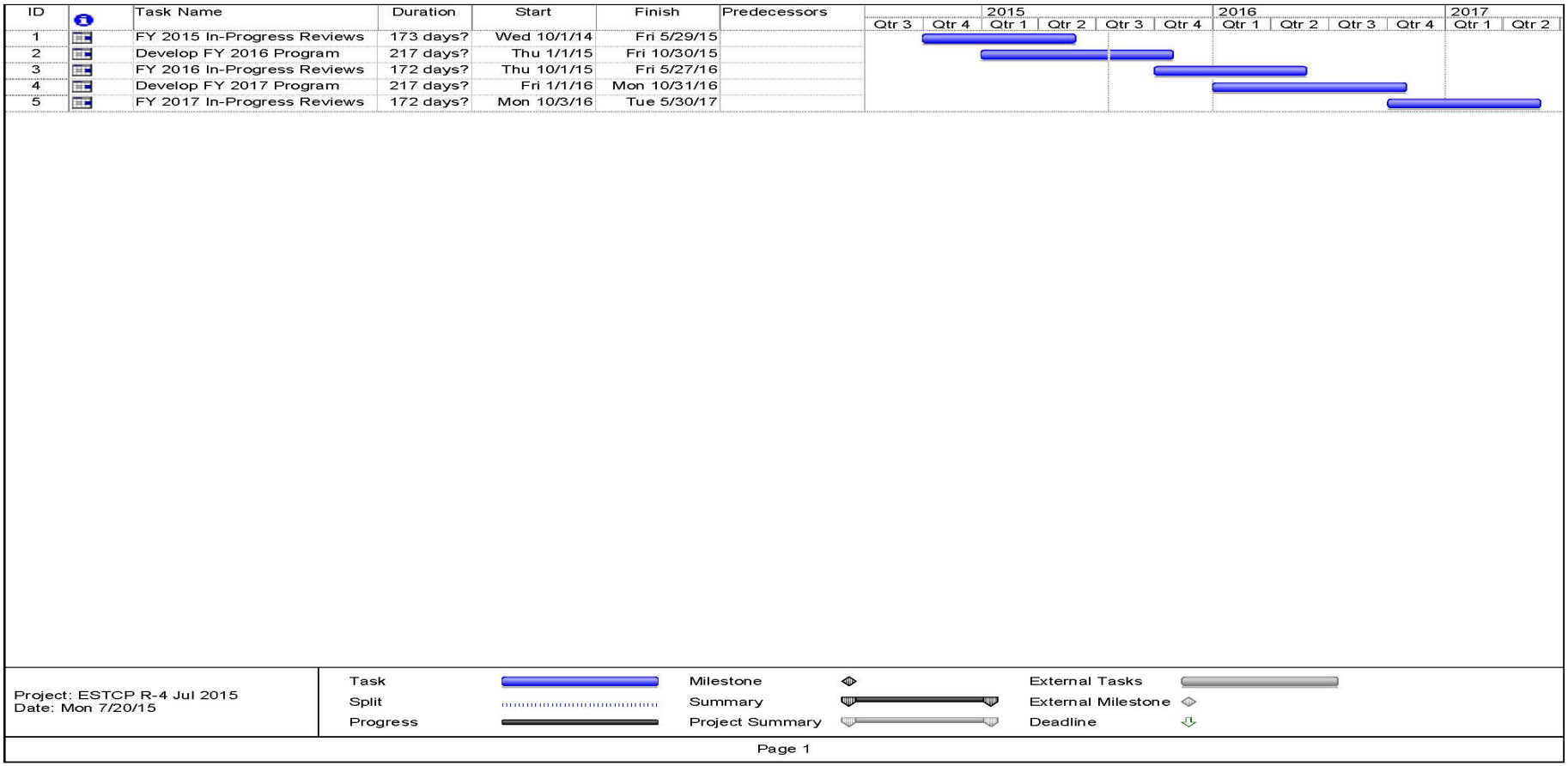


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603851D8Z / *Environmental Security Technology Certification Program*	**Project (Number/Name)** P514 / *Environmental Security Technology Certification Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
In Progress Reviews				
FY 2015 In Progress Reviews	1	2015	3	2015
FY 2016 In Progress Reviews	1	2016	3	2016
FY 2017 In Progress Reviews	1	2017	3	2017
Develop Program				
Develop FY 2016 Program	1	2015	4	2015
Develop FY 2017 Program	1	2016	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	37.676	9.930	10.110	10.007	-	10.007	10.992	11.580	11.659	11.886	Continuing	Continuing
920: *Humanitarian De-mining*	37.676	9.930	10.110	10.007	-	10.007	10.992	11.580	11.659	11.886	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Under the Office of the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (OASD SO/LIC), the Humanitarian Demining Research and Development (HD R&D) program element develops, demonstrates and validates new technologies for DoD-supported nations to detect and clear landmines and unexploded ordnance (UXO), and to contribute to US military countermine R&D. The HD R&D Program works closely with the Geographical Combatant Commands (GCC) and the Humanitarian Demining Training Center (HDTC) to identify, develop and implement mine/UXO detection and clearance technologies; speed improvements to technologies used by U.S. forces in support of USG operations; reduce the threat to host nation population and US forces; reduce insurgent access to explosives (landmines and UXO); enhance mine action capacity of non-governmental organizations and mine action centers in mine-affected countries; and provide engagement opportunities for DoD personnel in mine-affected countries.

Evaluations of HD R&D Program-developed technologies in actual minefields are conducted by host nation demining partners (foreign military, non-governmental organizations and mine action centers) and provide valuable data for US military countermine R&D and next generation HD technology developments while directly contributing to world-wide mine and UXO clearance. Since 1995 the program has fielded technologies for 189 evaluations in 39 countries, including Vietnam, Cambodia, Zimbabwe, Iraq and Afghanistan. The program's technologies have cleared 33.5 million square meters of the world's toughest minefields; found or destroyed 159,000 mines and UXO; and provided 387,000 mine/UXO disposal charges with 50 tons of explosive recovered from stockpiles and abandoned munitions in PACOM.

New technology requirements and areas of emphasis are identified and validated at a biennial Requirements Workshop and a biennial UXO Working Group Meeting held by OASD SO/LIC. The meetings involve representatives from Department of State (DOS), GCCs and mine-affected nations. The program element's work is consistent with the Department of Defense's strategic guidance to address instability and reduce the demand for significant US force commitments to stability operations; with DODI 3000.05 to foster security, economic security and development, and build indigenous capacity; and with § 407 and CJCSI 3207.01C to reduce the social, economic and environmental impact of landmines, unexploded ordnance and small arms ammunition.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	10.180	10.129	10.451	-	10.451
Current President's Budget	9.930	10.110	10.007	-	10.007
Total Adjustments	-0.250	-0.019	-0.444	-	-0.444
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.246	-			
• Internal Adjustments.	-0.004	-	-0.444	-	-0.444
• FFRDC	-	-0.019	-	-	-

Change Summary Explanation

In FY17 $0.142M of the $0.444 is to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: 0603920D8Z - SO/LIC Humanitarian De-mining	9.930	10.110	10.007

Description: The HD R&D Program adapts commercial-off-the-shelf equipment, integrates mature technologies, and leverages R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countermine mission area. The program aims to improve existing technologies for: mine/unexploded ordnance (UXO) detection, technical survey/area reduction, mechanical mine/UXO clearance, underwater UXO detection and clearance, vegetation clearance, mine neutralization, and post-clearance quality control (QC).

FY 2015 Accomplishments:

• Program's technologies cleared 6 million square meters of the world's toughest minefields and UXO threat areas, removing or destroying over 9,000 mines and 20,000 UXO

• The program developed and tested nineteen prototype technologies, including: Six-tine Rotary Mine Comb, Rotary Mine Comb Lite, Sparrow, Piranha III, Light Soil Sifter, Underwater Detection System, Empact, Pacmag, Scorpion, Improved Minehound, Delta, Mine Burner, Transparent Armor, Mine Action Management System, Monitoring System, Aerial Survey System, Mobile Operator Control Station, Severe Terrain Support Vehicle, and Rambo

• Continued 56 on-going operational field evaluations in 14 countries

• Began new live minefield evaluations of Handheld Standoff Mine Detection System (HSTAMIDS) in Zimbabwe; two each Raptors in Afghanistan; Severe Terrain Support Vehicle in Marshall Islands and Solomon Islands; Target Reacquisition Position

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
System in West Bank; Aerial Survey System in Cambodia and Chile; Wet Soil Sifting System in Solomon Islands; and the Remote Monitoring Station in Thailand. • Supported combatant commands and Embassy staffs by conducting site surveys and country assessments in Kosovo and Zimbabwe ***FY 2016 Plans:*** • Deploy new technology, including the Medium MineWolf in Thailand; the Rambo, Mini MineWolf and Scorpion and the Sparrow in Cambodia; Rex I in Sri Lanka; Rex II in Angola; and the Storm and Six-Tine Rotary Mine Comb in Afghanistan • Continue to support ongoing FY2015 operational field evaluations • Support the combatant commands and Embassy staffs by conducting site surveys and country assessments, including those planned in Thailand, Colombia, Angola, Bosnia Herzegovina, Kosovo, Georgia, Vietnam, and Laos • Develop, test and evaluate new prototype technologies in the following areas: technical survey, individual mine/UXO and minefield detection, mechanical mine/UXO and vegetation clearance, underwater UXO detection and clearance, mine neutralization, and post-clearance quality assurance (QA) ***FY 2017 Plans:*** • Complete ongoing equipment developments/modifications • Continue successful operational evaluations from FY2016 • Support the combatant commands and Embassy staffs by conducting new site surveys and country assessments • Develop, test and evaluate new prototype technologies based on feedback from the field in the following areas: technical survey, individual mine/UXO and minefield detection, mechanical mine/UXO and vegetation clearance, underwater UXO detection and clearance, mine neutralization, and post-clearance QA			
Accomplishments/Planned Programs Subtotals	9.930	10.110	10.007

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Following a rapid prototyping strategy, the program emphasizes the use/modification of existing, commercially-available equipment and components to build functional prototype equipment suited for humanitarian demining operations. This approach is required due to the immediate need for new demining technologies in the face of ongoing U.S. forces and host nation citizen casualties in mine-affected countries. The program evaluates prototype equipment by acquiring it off-the-shelf from industry using competition to the extent possible, by leveraging ongoing countermine R&D efforts in other U.S. and foreign R&D activities, and by taking advantage of extensive in-house fabrication capabilities at the Army's Night Vision and Electronic Sensors Division (NVESD).

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*

F. Performance Metrics

Long Term Strategies: Obtain adequate funding to support critical shortfalls; prioritize proposals that are deemed acceptable and allocate funding accordingly; and establish outreach programs to leverage institutional knowledge and expertise.

Performance Indicator and Rating:
FY 2015 Target:
90% of currently funded research technologies are completed on time and within budget
Complete scheduled R&D project tasks
Transition field-ready technologies to host nation demining partners

FY 2016 Target:
90% of currently funded research technologies are completed on time and within budget
Complete scheduled R&D project tasks
Transition field-ready technologies to host nation demining partners
Conduct biennial Humanitarian R&D Program Requirements Workshop

FY 2015 Performance Rating: Currently the number of funded research technologies is on track to be completed per the target.

Verification: The Humanitarian Demining Program performs program reviews with other USG agencies (DOS PM WRA, DSCA, HDTC, CENTCOM, PACOM, SOUTHCOM, AFRICOM, EUCOM) and has oversight from OSD SO/LIC.

Validation: Completed R&D products increase the capabilities of the DoD to effectively perform demining missions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / *Humanitarian De-mining*	Project (Number/Name) 920 / *Humanitarian De-mining*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Various	RDECOM-NVESD : Ft Belvoir, VA	21.912	6.670		6.875		5.055		-		5.055	-	-	-
		Subtotal	21.912	6.670		6.875		5.055		-		5.055	-	-	-

Remarks

The HD R&D Program adapts commercial-off-the-shelf equipment, integrates mature technologies, and leverages R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countermine mission area.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Humanitarian Demining Research and Development Program	Various	RDECOM-NVESD : Ft Belvoir, VA	14.438	2.858		2.834		4.697		-		4.697	-	-	-
		Subtotal	14.438	2.858		2.834		4.697		-		4.697	-	-	-

Remarks

Evaluations of HD R&D Program-developed technologies in actual minefields are conducted by host nation demining partners (foreign military, non-governmental organizations and mine action centers) and provide valuable data for US military countermine R&D and next generation HD technology developments while directly contributing to world-wide mine and UXO clearance.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Humanitarian Demining Program Management Support	Various	RDECOM-NVESD : Ft Belvoir, VA	1.326	0.402		0.401		0.255		-		0.255	-	-	-
		Subtotal	1.326	0.402		0.401		0.255		-		0.255	-	-	-

Remarks

The HD R&D Program managers oversee adaptation of commercial-off-the-shelf equipment, integration of mature technologies, and leverage of R&D activity within DoD, particularly in the Army's Night Vision and Electronic Sensors Directorate (NVESD) Tactical Countermine mission area. Areas of emphasis are identified and validated at a

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / *Humanitarian De-mining*	Project (Number/Name) 920 / *Humanitarian De-mining*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
biennial Requirements Workshop held by OASD SO/LIC. The Requirements Workshop involves representatives from Department of State (DoS), U.S. combatant commands (COCOMS) and mine-affected nations.															

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.676	9.930		10.110		10.007		-		10.007	-	-	-

Remarks

The Humanitarian Demining Research and Development (HD R&D) program element rapidly develops, demonstrates and validates new technologies for DoD-supported nations to detect and clear landmines and unexploded ordnance (UXO), and to contribute to US military countermine R&D. The HD R&D Program focuses on development of new technologies to improve the efficiency and safety of indigenous nation-conducted, post-conflict clearance of residual mines and UXO, which pose a serious threat to US forces conducting stability operations, and to the host nation's population and economy.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*	**Project (Number/Name)** 920 / *Humanitarian De-mining*

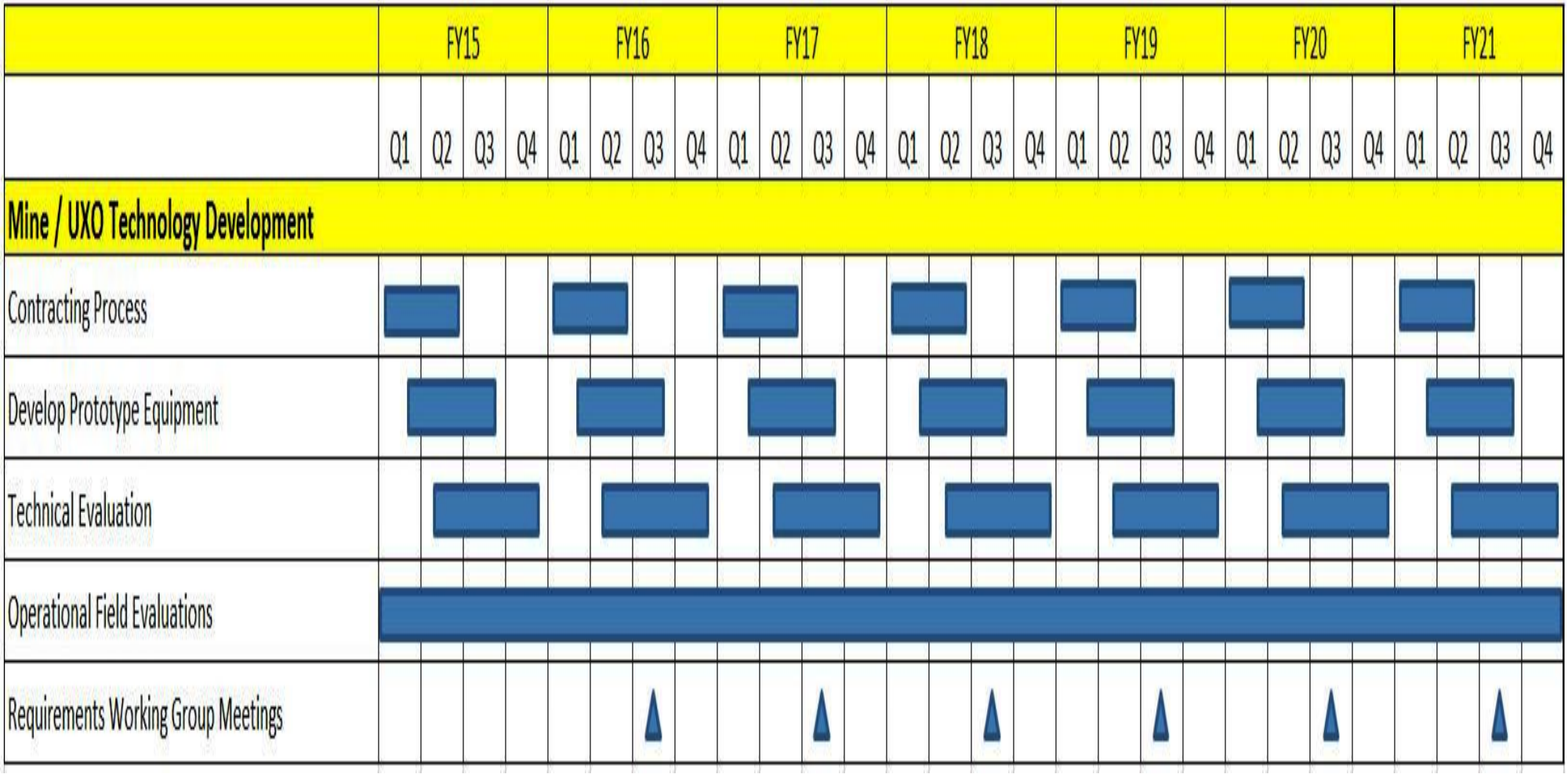

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603920D8Z / *Humanitarian De-mining*	**Project (Number/Name)** 920 / *Humanitarian De-mining*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Mechanical Mine/UXO Clearance Systems	1	2015	4	2021
Mine/UXO Detection Systems	1	2015	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	31.545	9.974	10.330	10.126	-	10.126	10.822	11.115	11.266	11.486	Continuing	Continuing
P923: *Coalition Warfare*	31.545	9.974	10.330	10.126	-	10.126	10.822	11.115	11.266	11.486	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Coalition Warfare Program (CWP) supports DoD organizations that: 1) work with foreign partners to collaboratively address strategic technology gaps for current and future missions; 2) develop interoperability solutions for coalition operations; and 3) develop and strengthen defense relationships. CWP is the only Office of the Secretary of Defense (OSD) program with this mission. Coalition warfare and multinational operations are fundamental features of the U.S. national security strategy. Coalitions provide a broad base of technological, operational, and logistical support for military operations and ease the U.S. financial and manpower burdens associated with meeting military goals and objectives. Coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

CWP supplements a U.S. Government proponent's funding for cooperative efforts, ensuring U.S. funds are sufficient to complete the engagement with the foreign partner(s). When CWP funds are used to help fund a cooperative project, that project leverages technical and financial contributions of the foreign partner(s) and speeds up the development and delivery of technical solutions to the warfighter. In its fifteen-year history, CWP has leveraged $4 of foreign partner funding from 76 foreign partners and $3 of other U.S. Government funding for every $1 CWP has invested in cooperative projects. CWP funding enables DoD project teams to move a technology into the next stage of development or to complete and transition a technology to operational forces. These projects may also form the basis for future cooperation with international partners.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	10.125	10.350	10.432	-	10.432
Current President's Budget	9.974	10.330	10.126	-	10.126
Total Adjustments	-0.151	-0.020	-0.306	-	-0.306
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	-0.020			
• SBIR/STTR Transfer	-0.147	-			
• Baseline program adjustments	-	-	-0.035	-	-0.035
• Efficiency Reduction	-	-	-0.191	-	-0.191
• Economic Assumptions Adjustment	-	-	-0.080	-	-0.080

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*

Change Summary Explanation

Program baseline reduced to fund other department priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / *Coalition Warfare*	Project (Number/Name) P923 / *Coalition Warfare*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P923: *Coalition Warfare*	31.545	9.974	10.330	10.126	-	10.126	10.822	11.115	11.266	11.486	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Coalition Warfare Program (CWP) supports DoD organizations that: 1) work with foreign partners to collaboratively address strategic technology gaps for current and future missions; 2) develop interoperability solutions for coalition operations; and 3) develop and strengthen defense relationships. CWP is the only Office of the Secretary of Defense (OSD) program with this mission. Coalition warfare and multinational operations are fundamental features of the U.S. national security strategy. Coalitions provide a broad base of technological, operational, and logistical support for military operations and ease the U.S. financial and manpower burdens associated with meeting military goals and objectives. Coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

CWP supplements a U.S. Government proponent's funding for cooperative efforts, ensuring U.S. funds are sufficient to complete the engagement with the foreign partner(s). When CWP funds are used to help fund a cooperative project, that project leverages technical and financial contributions of the foreign partner(s) and speeds up the development and delivery of technical solutions to the warfighter. In its fifteen-year history, CWP has leveraged $4 of foreign partner funding from 76 foreign partners and $3 of other U.S. Government funding for every $1 CWP has invested in cooperative projects. CWP funding enables DoD project teams to move a technology into the next stage of development or to complete and transition a technology to operational forces. These projects may also form the basis for future cooperation with international partners.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Previous Year Continuing Projects	8.509	5.017	0.913
Description: Program provided additional funding to projects that began in earlier selection cycles. Currently funded portfolio includes projects with 16 different foreign partners.			
FY 2015 Accomplishments: Continuation of efforts that will result in improved real-time communications in urban settings and improved detection of biological agents.			
FY 2016 Plans: Completion of efforts that will result in improved submarine force network interoperability, improved standoff detection of explosives, and non-lethal options for disabling maritime vessels.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Completion of efforts that will enhance detection, classification and mapping of underwater munitions and mines and increase underwater power to sensors in marine environments.			
Title: Advanced Solid Fuel Ramjet Ground Demonstrator for Air-Launched Tactical Missile Systems ***Description:*** US Navy project to increase stand-off range of air- and surface-launched missiles by developing and demonstrating solid fuel ramjet technologies. ***FY 2016 Plans:*** Define system technical design and requirements; evaluate alternate system design options, and select optimum design. ***FY 2017 Plans:*** Perform subscale fuel performance testing; complete subsystem components and mechanical hardware design and analysis; test subsystem/components and verify design functionality and performance.	-	0.280	0.672
Title: Chemical Agent Detector-Kit Colorimetric Reader ***Description:*** US Army project to improve warfighters' ability to determine whether it is safe to unmask in an environment where chemical warfare agent might be present by developing a prototype color reader accessory for the M256A2 Chemical Agent Detector Kit. ***FY 2017 Plans:*** Test breadboard prototype against threat chemical agents.	-	-	0.200
Title: Coalition ISR Asset Interoperability ***Description:*** US Army project that will enable autonomous cross-cueing and shared control of intelligence, surveillance, and reconnaissance (ISR) assets on the ground and various mobile platforms through development of open standard architecture for autonomous plug-and-play interoperability of fixed and mobile coalition ISR assets. ***FY 2016 Plans:*** Develop operational concepts and conduct initial tests. ***FY 2017 Plans:*** Modify software and conduct additional tests. Update architecture and develop draft standardization specification.	-	0.366	0.544
Title: Compact Wide-band Optics for Multispectral Infrared Imaging System ***Description:*** US Navy project to reduce the size, weight, power and cost of imaging sensors on weight-sensitive platforms by developing compact wide-band infrared imaging lens system. ***FY 2016 Plans:***	-	0.328	0.522

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Measure physical and optical properties of initial prototypes. ***FY 2017 Plans:*** Complete construction of initial prototypes.			
Title: Directed Energy Power Systems ***Description:*** US Navy project to improve directed energy weapons interface with ship's electrical power by combining flywheel technology with advanced power system control techniques. ***FY 2016 Plans:*** Prepare test site, and develop test plans. Establish concept of operations and mission objectives. ***FY 2017 Plans:*** Perform advanced controls research, development, and experiments.	-	0.285	0.530
Title: Deny the Enemy through Electromagnetic Cavity Tracking ***Description:*** Combating Terrorism Technical Support Office project to improve subterranean detection. ***FY 2016 Plans:*** Bi-static system prototype design, enhancement, and fabrication; test and evaluation support.	-	0.676	-
Title: Micro-Layered Transparent Armor ***Description:*** US Navy project to obtain a two-fold reduction in transparent armor weight through use of revolutionary micro-layer transparent armor. ***FY 2016 Plans:*** Set up and calibrate facility. Begin modeling of micro-layer armor. ***FY 2017 Plans:*** Scale up and conduct ballistic testing.	-	0.269	0.474
Title: Enhanced Maritime Domain Awareness Utilizing Multi-Input Multi-Output Enabled 2-D Over the Horizon Radar ***Description:*** US Navy project to improve persistent, long-range maritime surveillance by implementing improvements to over the horizon radar. ***FY 2016 Plans:*** Conduct initial system level data collection and preliminary analysis. ***FY 2017 Plans:***	-	0.575	0.467

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Conduct additional data collection, process collected data and conduct analysis. Evaluate effectiveness and analyze impact of practical implementation.			
Title: Optoelectronic Oscillator Frequency Comb as a GPS-alternative for assured Positioning, Navigation, Timing ***Description:*** US Army project to maintain warfighters' access to position, navigation, and timing signals when GPS is jammed or unavailable by creating an alternative system for the transmission of synchronization signals. ***FY 2016 Plans:*** Construct free-space frequency transfer system in a controlled environment. ***FY 2017 Plans:*** Collect environmental data and conduct field tests.	-	0.150	0.170
Title: Space Situational Awareness Nanosat Development ***Description:*** US Air Force project to improve tracking of space objects and debris in real-time. ***FY 2016 Plans:*** Collaboration of space-situational awareness (SSA) payload. ***FY 2017 Plans:*** Completion of brassboard SSA payload and flight unit.	-	0.118	0.118
Title: High Altitude Long Endurance Solar Powered UAS ***Description:*** US Navy project to provide enduring airborne intelligence, surveillance, and reconnaissance (ISR) capability by developing an ultra-lightweight and low power communications and ISR relay platform and integrating onto solar power UAS airframe. ***FY 2015 Accomplishments:*** Payload design. Hardware purchase and testing. ***FY 2016 Plans:*** Prototype payload development. ***FY 2017 Plans:*** Payload integration with airframe.	0.450	0.460	0.421
Title: Tasked Target Text Data Web Features Services ***Description:*** US Air Force project to automate transfer of information from Air Operations Center to tactical units.	-	0.303	0.260

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2016 Plans: Adapt current tools to automatically push and receive data. ***FY 2017 Plans:*** Conduct integration testing and initial prototype testing.			
Title: High Efficiency, Ultra-Thin Silicon Solar Cells for Expeditionary Power ***Description:*** US Marine Corps project to increase mission endurance by creating a lightweight, man-portable solar array. ***FY 2016 Plans:*** Testing and characterization of ultra thin Si Wafers. ***FY 2017 Plans:*** Production of improved design and characterization of Si solar cells. Fabrication and testing.	-	0.220	0.380
Title: Coalition Undersea Power and Data Station for Autonomous Vehicle Charging ***Description:*** US Navy project to autonomously transfer wireless energy to undersea vehicles. ***FY 2016 Plans:*** Technical analysis and engineering. Equipment purchase. ***FY 2017 Plans:*** System development and integration.	-	0.162	0.380
Title: Automated/Cooperative Navigation & Control of Multiple Unmanned Maritime Vehicles From Single Unmanned Surface Vehicle ***Description:*** US Navy project to enable simultaneous control of multiple UUVs by developing prototype navigation and localization systems. ***FY 2017 Plans:*** Conduct site survey and develop test plan and procedures for sea trial.	-	-	0.206
Title: Project Selections ***Description:*** Program will conduct competitive nomination process to identify new projects. ***FY 2017 Plans:***	-	-	2.846

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Projects selected based on Combatant Command, Service, Joint Staff, OSD, and DoD Agency priorities and requirements.			
Title: Coalition Warfare Program (CWP) Support ***Description:*** Program funds contractors to support CWP program management, which includes: ensuring CWP projects are consistent with the policies and principles articulated in Department of Defense directives and regulations; monitoring project progress toward goals and objectives to include tracking project budget execution; providing assessments of program status and risk to higher authorities; briefing and providing recommendations to the Director, International Cooperation concerning new and continuing CWP projects; supporting periodic meetings to foster international cooperation and improve U.S. interoperability with foreign partners; supporting CWP proposal selection process and coordinating financial activities at the OUSD(AT&L) level; briefing program stakeholders on the status of CWP projects and interoperability initiatives; educating Combatant Command, Service, Agency, and OSD personnel about the CWP and the opportunity to improve coalition interoperability. ***FY 2015 Accomplishments:*** Contractor provides management support of the CWP, to include evaluating proposals for FY16 funding, attends RDT&E meetings and events, and monitors and manages projects' technical and financial performance. ***FY 2016 Plans:*** Contractor provides management support of the CWP, to include evaluating proposals for FY17 funding, attends RDT&E meetings and events, and monitors and manages projects' technical and financial performance. ***FY 2017 Plans:*** Contractor provides management support of the CWP, to include evaluating proposals for FY18 funding, attends RDT&E meetings and events, and monitors and manages projects' technical and financial performance.	0.531	0.541	0.552
Title: Interoperability and Collaboration Initiatives ***Description:*** Program provides funds in support of new or planned acquisition programs with the aim of 1) promoting coalition interoperability early in the requirements or technical development phases, 2) harmonizing common goals between U.S. and foreign partners, 3) improving management of collaborative efforts. Funds support workshops, risk reduction efforts, standards development, architecture analysis, and information management initiatives. ***FY 2015 Accomplishments:*** Program funds efforts aimed at building partnerships, improving U.S. interoperability with foreign partners and improving collaborative project processes. ***FY 2016 Plans:***	0.484	0.580	0.471

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Program will fund efforts aimed at building partnerships, improving U.S. interoperability with foreign partners and improving collaborative project processes. ***FY 2017 Plans:*** Program will fund efforts aimed at building partnerships, improving U.S. interoperability with foreign partners and improving collaborative project processes.			
Accomplishments/Planned Programs Subtotals	9.974	10.330	10.126

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Combatant Commands, Services, Defense Agencies, and the Office of the Secretary of Defense nominate candidate projects on an annual basis. CWP provides selected projects up to three years of funding. The Program selects projects that address DoD priorities and meet the needs and requirements specified by the Joint Staff and the Combatant Commanders. Projects have equitable contributions from international partners, strong potential for transition, and contribute to allied interoperability and/or meet a user need.

E. Performance Metrics

After successful completion of the competitive nomination process, initial project funding is dependent on receipt of project documentation, which includes financial information, project plan, description of project team, etc. Continued project funding is dependent on compliance with CWP requirements, which include: adequate progress toward each project's stated goals, timely reporting on financial status and project activities, provision of updated project plans and charts, and progress towards transition goals.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Coalition Warfare Program Project Product Development Costs	Various	Various : Various	20.804	7.279		8.239		7.760		-		7.760	-	-	-
		Subtotal	20.804	7.279		8.239		7.760		-		7.760	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Coalition Warfare Program Project Test and Evaluation Costs	Various	Various : Various	5.963	1.894		1.296		1.556		-		1.556	-	-	-
		Subtotal	5.963	1.894		1.296		1.556		-		1.556	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Coalition Warfare Program Project Management Services Costs	Various	Various : Various	4.778	0.801		0.795		0.810		-		0.810	-	-	-
		Subtotal	4.778	0.801		0.795		0.810		-		0.810	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.545	9.974		10.330		10.126		-		10.126	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

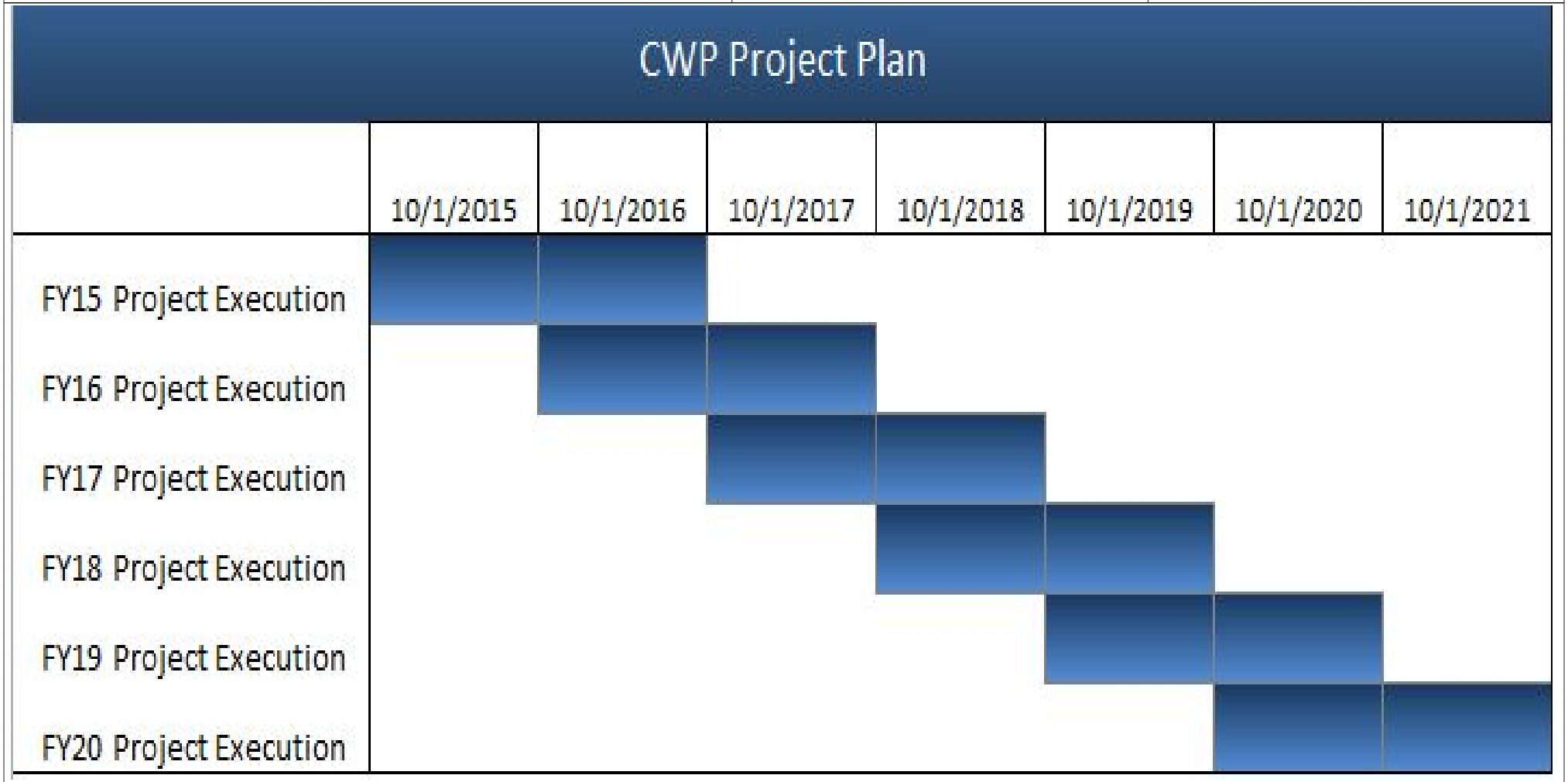

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603923D8Z / *Coalition Warfare*	**Project (Number/Name)** P923 / *Coalition Warfare*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 CWP Project Execution	1	2015	4	2016
FY16 CWP Project Execution	1	2016	4	2017
FY17 CWP Project Execution	1	2017	4	2018
FY18 CWP Project Execution	1	2018	4	2019
FY19 CWP Project Execution	1	2019	4	2020
FY20 CWP Project Execution	1	2020	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	84.107	12.519	6.518	3.893	-	3.893	3.866	3.533	3.582	3.653	Continuing	Continuing
P015: *Corrosion Protection Projects*	84.107	12.519	6.518	3.893	-	3.893	3.866	3.533	3.582	3.653	Continuing	Continuing

Note

The FY 2016 funding request was reduced by $1.521 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

The purpose of this program is to develop a comprehensive capability to prevent and mitigate corrosion and its effects on Department of Defense (DoD) weapon systems and infrastructure. Corrosion severely impacts system and facility reliability, readiness and safety, and consumes a disproportionate amount of material and labor hours for repair and treatment of corrosion damaged systems and facilities. The cost of corrosion across the DoD has been estimated at over 23 billion each year. The impact and cost of corrosion are so pervasive that Congress enacted Public Law 107-314 Sec: 1067 [portions codified in 10 U.S.C. 2228]: Prevention and mitigation of corrosion of military infrastructure and equipment. This legislation requires that DoD develop a long-term corrosion strategy to include establishment of a coordinated R&D program with transition plans. The legislation also requires that DoD designate a responsible official or organization to oversee a corrosion prevention and mitigation program. The responsibilities of the Director, Corrosion Policy and Oversight and the Military Department Corrosion Prevention and Control Executives were further delineated in DODI 5000.67 "Prevention and Mitigation of Corrosion on Military Equipment and Infrastructure" of 01 February 2010.

The Deputy Secretary of Defense designated the Principal Deputy Under Secretary of Defense (Acquisition, Technology, and Logistics) (PDUSD(AT&L)) as the DoD Corrosion Executive in May 2003. The DoD Corrosion Executive subsequently established a Corrosion Control and Oversight office to implement the program. Subsequently, in accordance with Section 371 of the 2008 National Defense Authorization Act, the Under Secretary of Defense (USD(AT&L)) designated a Director, Corrosion Policy and Oversight to perform the duties of the DoD Corrosion Executive with responsibilities as described in the 2008 NDAA legislation. A major responsibility of the Director, Corrosion Policy and Oversight is to select high payoff research and development projects that promise to prevent or mitigate corrosion and significantly reduce the total cost of corrosion along with the adverse impact of corrosion effects on weapon system and infrastructure operational capability. This office chartered a Corrosion Prevention and Control Integrated Product Team (CPCIPT) that has selected and funded Operation and Maintenance projects for each Fiscal Year (FY) commencing in FY 2005. However, the DoD CPCIPT has determined that the biggest payoff in corrosion prevention and mitigation will come from investing in up-front prevention technologies, materials, and processes to leverage downstream cost avoidance in corrosion maintenance and repair. Likewise, development of improved predictive and prognostic techniques can eliminate unseen failure and reduce unnecessary maintenance and repair costs. Thus, technology development, demonstration, and transition projects have been selected and funded since FY 2006. In addition, the University Corrosion Collaboration (now the Technical Corrosion Collaboration (TCC)) was formed as collaboration between universities, academies and research laboratories, focused on corrosion technology research and development to provide solutions to long-term, complex corrosion prevention and control problems, including metallic-non-metallic interactions, advanced surface coatings and treatments for non-traditional use of materials. This advanced corrosion research has been funded since FY 2008 and performed by teams from TCC participating organizations.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*

In FY 2009, the Military Departments assigned corrosion executives and began submitting reports to Congress on inserting corrosion planning into the acquisition process. The FY 2011 NDAA added a requirement for the DoD to report the amount of funds requested in the preceding year budget for each planned project or activity, as compared to the funding required for each project or activity. These funds provide a portion of the funds used to implement associated corrosion control projects and activities.

These projects address critical corrosion issues in both Department of Defense infrastructure as well as warfighting systems. A number of low-risk, high-payoff technologies promise to vastly improve the service life and significantly reduce the maintenance costs of storage tanks and other mission support facilities essential to maintain support for the warfighter. Each of the services has identified important projects that vastly increase operational readiness and reduce operations and maintenance costs. All services are studying corrosion inhibitors that improve reliability and life of electrical and avionics equipment. Likewise, an array of highly effective, rapid cure coatings that are easy to apply and can forestall corrosion for many years on aircraft and ships are being developed. Other vital projects being considered include sealants, wash down systems, sensors and prognostic technologies that have joint service applications and potential to prevent and mitigate corrosion and its effects over a wide range of systems.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	12.907	1.518	4.010	-	4.010
Current President's Budget	12.519	6.518	3.893	-	3.893
Total Adjustments	-0.388	5.000	-0.117	-	-0.117
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-0.388	-	-0.013	-	-0.013
• Economic Assumptions Adjustment	-	-	-0.031	-	-0.031
• Departmental Efficiency Adjustment	-	-	-0.073	-	-0.073

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: P015: *Corrosion Protection Projects*		
Congressional Add: *Corrosion Control, Prevention and Prediction through Coatings, Materials and Maintenance R&D*	10.000	-
Congressional Add Subtotals for Project: P015	10.000	-
Congressional Add Totals for all Projects	10.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*

Change Summary Explanation

Baseline adjustment reflects funding for internal AT&L priorities and requirements.

NOTE: The FY 2016 funding request was reduced by $1.521 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / *Department of Defense Corrosion Program*	Project (Number/Name) P015 / *Corrosion Protection Projects*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P015: *Corrosion Protection Projects*	84.107	12.519	6.518	3.893	-	3.893	3.866	3.533	3.582	3.653	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The purpose of this program is to develop a comprehensive capability to prevent and mitigate corrosion and its effects on Department of Defense (DoD) weapon systems and infrastructure. Corrosion severely impacts system and facility reliability, readiness and safety, and consumes a disproportionate amount of material and labor hours for repair and treatment of corrosion damaged systems and facilities. The cost of corrosion across the DoD has been estimated at over 23 billion each year. The impact and cost of corrosion are so pervasive that Congress enacted Public Law 107-314 Sec: 1067 [portions codified in 10 U.S.C. 2228]: Prevention and mitigation of corrosion of military infrastructure and equipment. This legislation requires that DoD develop a long-term corrosion strategy to include establishment of a coordinated R&D program with transition plans. The legislation also requires that DoD designate a responsible official or organization to oversee a corrosion prevention and mitigation program. The responsibilities of the Director, Corrosion Policy and Oversight and the Military Department Corrosion Prevention and Control Executives were further delineated in DODI 5000.67 "Prevention and Mitigation of Corrosion on Military Equipment and Infrastructure" of 01 February 2010.

The Deputy Secretary of Defense designated the Principal Deputy Under Secretary of Defense (Acquisition, Technology, and Logistics) (PDUSD(AT&L)) as the DoD Corrosion Executive in May 2003. The DoD Corrosion Executive subsequently established a Corrosion Control and Oversight office to implement the program. Subsequently, in accordance with Section 371 of the 2008 National Defense Authorization Act, the Under Secretary of Defense (USD(AT&L)) designated a Director, Corrosion Policy and Oversight to perform the duties of the DoD Corrosion Executive with responsibilities as described in the 2008 NDAA legislation. A major responsibility of the Director, Corrosion Policy and Oversight is to select high payoff research and development projects that promise to prevent or mitigate corrosion and significantly reduce the total cost of corrosion along with the adverse impact of corrosion effects on weapon system and infrastructure operational capability. This office chartered a Corrosion Prevention and Control Integrated Product Team (CPCIPT) that has selected and funded Operation and Maintenance projects for each Fiscal Year (FY) commencing in FY 2005. However, the DoD CPCIPT has determined that the biggest payoff in corrosion prevention and mitigation will come from investing in up-front prevention technologies, materials, and processes to leverage downstream cost avoidance in corrosion maintenance and repair. Likewise, development of improved predictive and prognostic techniques can eliminate unseen failure and reduce unnecessary maintenance and repair costs. Thus, technology development, demonstration, and transition projects have been selected and funded since FY 2006. In FY 2009, the Military Departments assigned corrosion executives and began submitting reports to Congress on inserting corrosion planning into the acquisition process. The FY 2011 NDAA added a requirement for the DoD to report the amount of funds requested in the preceding year budget for each planned project or activity, as compared to the funding required for each project or activity. These funds provide a portion of the funds used to implement associated corrosion control projects and activities.

These projects address critical corrosion issues in both Department of Defense infrastructure as well as warfighting systems. A number of low-risk, high-payoff technologies promise to vastly improve the service life and significantly reduce the maintenance costs of storage tanks and other mission support facilities essential to maintain support for the warfighter. Each of the services has identified important projects that vastly increase operational readiness and reduce operations and maintenance costs. All services are studying corrosion inhibitors that improve reliability and life of electrical and avionics equipment. Likewise, an array of highly

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

effective, rapid cure coatings that are easy to apply and can forestall corrosion for many years on aircraft and ships are being developed. Other vital projects being considered include sealants, wash down systems, sensors and prognostic technologies that have joint service applications and potential to prevent and mitigate corrosion and its effects over a wide range of systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Corrosion Prevention and Control Projects and Activities	2.519	6.518	3.893
FY 2015 Accomplishments: Continued to work with the Services to develop and transition mature technologies Refined and improved acquisition policies related to corrosion control a. DoDI 5000.02 b. Defense Acquisition Guidebook (Chapters on Systems Engineering and Life Cycle Sustainment) Continued to provide oversight of corrosion planning for ACAT I systems Completed impact of corrosion studies - all defense segments; developed predictive capabilities Issued MIL-HDBK-1250 as a non-governmental standard Developed non-governmental standard on “Corrosion Planning” for equipment and infrastructure – currently in balloting Drafted major revision of DoDI 5000.67 “Prevention and Mitigation of Corrosion on DoD Military Equipment and Infrastructure” Deployed major upgrade to Product Introduction Tool on www.corrdefense.org			
FY 2016 Plans: Continue to work with the Services to develop and transition mature technologies Refine and improve acquisition policies related to corrosion control Re-issue DoDI 5000.67 “Prevention and Mitigation of Corrosion on DoD Military Equipment and Infrastructure” Continue to provide oversight of corrosion planning for ACAT I systems Complete impact of corrosion studies on additional defense segments; complete development of predictive capabilities Issue joint SSPC/NACE standard on Corrosion Planning			
FY 2017 Plans: Continue to work with the Services to develop and transition mature technologies Refine and improve acquisition policies related to corrosion control Continue to provide oversight of corrosion planning for ACAT I systems Complete impact of corrosion studies on additional defense segments; perform pilot evaluation of selected ACAT I program using predictive capabilities Partner with the Services to provide corrosion training to military and DoD civilians			
Accomplishments/Planned Programs Subtotals	2.519	6.518	3.893

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

	FY 2015	FY 2016
Congressional Add: Corrosion Control, Prevention and Prediction through Coatings, Materials and Maintenance R&D	10.000	-
FY 2015 Accomplishments: Funded additional corrosion prevention and control (CPC) technology insertion projects: o Carbon Fiber Reinforced Polymer Rebar for Concrete Waterfront Facilities o Wood Treatment and Preservation o Polyurea Coating o Underwater Hull Preservation - Cost Reduction and Extended Service Life o Carbon Fiber Cables o Class IX Component Container Lid Enhancement o Electroplated Anticorrosion Coatings o Fiber Reinforced Polymer Composites for Water Control Structures o Viscous Elastic Coatings o Surface Decontamination for Bilges o Ultra High Performance Concrete o Verifying the Effectiveness of Vapor Phase Corrosion Inhibitors o Interlayer Coating for High Strength Steel H2 Embrittlement o Corrosion Preventative Materials for Threaded Components o CARC Compatibility with OEM Coatings on MHE Continued execution of the Technical Corrosion Collaboration (TCC) to reduce the impact of corrosion on DoD equipment and facilities: o Continued to emphasize the role of Services' subject matter experts (SME's) in the TCC; approximately half of the proposals received from research institutions had direct involvement from SME's o Expanded TCC to include significant projects at the USMA and USCGA o Added Oklahoma University and Scientific Simulation Systems, Inc. to the list of research institutions o First class of graduates from the University of Akron's BSc in Corrosion Engineering; of the 11 students Graduating, 10 have jobs in the corrosion control industry and 1 is attending graduate school o 79 graduate students supported across member research institutions to date o 94 refereed journal articles published to date		

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

	FY 2015	FY 2016
Increased periodicity of Impact of Corrosion Studies from once every three years to yearly; provides increased data fidelity and trending capabilities.		
Congressional Adds Subtotals	10.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Acquisitions are accomplished in three categories including projects, research opportunities, and activities as described in the DoD Corrosion Prevention and Mitigation Strategic Plan.

Projects are funded jointly by CPO and the Military Departments and are led by subject matter experts at the Military Department laboratories. CPO issues a call for proposed project plans in April and projects are submitted in June. The project plan format is contained in the DoD Corrosion Prevention and Mitigation Strategic Plan. The Corrosion Prevention and Control Integrated Project Team (CPCIPT) receives project plans and engages an evaluation panel to review proposed projects and make recommendations regarding project selection. Projects are also evaluated using Data Envelopment Analysis (DEA) to rank projects by relative efficiency. DEA factors include project performance period, ratio of OSD funding to Service funding, return-on-investment (ROI), degree to which the proposed technology addresses high-cost corrosion problems, potential benefits, joint service applicability, and probability of transition. Upon acceptance and approval of the projects, funding is distributed to the Military Departments by Military Interdepartmental Purchase Request (MIPR) based on funding priorities associated with the evaluation process results. Project execution is monitored through submission of quarterly quad charts and by conducting an annual review.

Research opportunities are funded through the Technical Corrosion Collaboration (TCC). A call for white paper proposals is issued by CPO through an existing U.S. Air Force Academy (USAFA) Broad Agency Announcement (BAA). Submissions are evaluated by a technical panel chaired by the Deputy Director, CPO. Evaluation factors include quality of proposed research, potential impact on DoD corrosion problems, level of student involvement, and proposed collaboration between the research institutions and DoD laboratories. Projects are ranked by the selection panel and funded based on merit and available funds. Research institutions receive funds for the TCC through the establishment of cooperative agreements with USAFA. Research execution is monitored through submission of quarterly quad charts and by conducting an annual review.

Activities are those work efforts associated with the Working Integrated Product Teams (WIPT) under the CPCIPT and include policy, training, specifications and standards, metrics, science and technology, facilities, and communication and outreach. WIPT Leads submit funding requirements associated with their annual tactical plan submission to CPO. The proposed activities are prioritized by CPO and funded based on merit and available funds. Activities are accomplished by both government and contractor personnel. Funds are transferred to government personnel through the MIPR process. Funds are transferred to contractor personnel

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

through competitively awarded contracts including the multiple-award Blanket Purchase Agreement held by CPO. Progress on activities is reviewed tri-annually at meetings of the CPCIPT.

E. Performance Metrics

Not applicable.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / *Department of Defense Corrosion Program*	Project (Number/Name) P015 / *Corrosion Protection Projects*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Corrosion Policy and Oversight	MIPR	Various (Army, Navy, Air Force) : Various	79.876	9.393		0.000		0.458		-		0.458	Continuing	Continuing	Continuing
		Subtotal	79.876	9.393		0.000		0.458		-		0.458	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Corrosion Poilcy and Oversight	Option/ FFP	Logistics Management Institute : McLean, VA	2.957	2.215	Oct 2014	5.759	Oct 2015	2.186	Oct 2016	-		2.186	Continuing	Continuing	Continuing
Corrosion Policy and Oversight	Option/ FFP	Decisive Analytics Corporation : Arlington, VA	1.274	0.911	Oct 2014	0.759	Oct 2015	1.249	Oct 2016	-		1.249	Continuing	Continuing	Continuing
		Subtotal	4.231	3.126		6.518		3.435		-		3.435	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	84.107	12.519		6.518		3.893		-		3.893	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

EXHIBIT R-4. SCHEDULE PROFILE	Date: 22 July 2015
Appropriation/ Budget Category: RDT&E, CORROSION PREVENTION AND CONTROL / BA 4	Program Element: 0604016D8Z

PROJECT / TASK	2014				2015				2016				2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	OCT NOV DEC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP	OCT NOV DEC	JAN FEB MAR	APR MAY JUN	JUL AUG SEP
TO 0001: CORROSION POLICY AND OVERSIGHT																				
DOD 5000-Series Review	100%				100%				0%				0%				0%			
Integration of CPC and CPC-Related Policy	100%				75%				0%				0%				0%			
DAG Review	100%				33%				0%				0%				0%			
Corrosion Board of Directors	100%				75%				0%				0%				0%			
DOD Corrosion Prevention and Mitigation Strategic Plan	100%				75%				0%				0%				0%			
USC Engagement	100%				75%				0%				0%				0%			
GAO Engagement	100%				75%				0%				0%				0%			
Corrosion Technology Implementation Projects Support	100%				75%				0%				0%				0%			
Training Gap Analysis	100%				100%				0%				0%				0%			
Corrosion Website Sustainment	100%				75%				0%				0%				0%			
Product Introduction and Qualification Tool	100%				75%				0%				0%				0%			
Facilitate/Support Corrosion Events	100%				100%				0%				0%				0%			
International Corrosion Partnerships and Engagements	100%				75%				0%				0%				0%			
Programmatic Support	100%				75%				0%				0%				0%			
Technical Corrosion Collaboration	100%				75%				0%				0%				0%			
TO 0001 Monthly Project Reviews																				
TO 0001: CORROSION TECHNOLOGY SUPPORT																				
Corrosion Prevention and Control (CPC) Review	100%				50%				0%				0%				0%			
DFARS Support	100%				100%				0%				0%				0%			
Funding Reviews	100%				75%				0%				0%				0%			
Weapon Systems and Infrastructure Oversight Support	100%				100%				0%				0%				0%			
Military Department Corrosion Program Review	100%				100%				0%				0%				0%			
Corrosion Technology Implementation Project Reviews	100%				75%				0%				0%				0%			
Corrosion Subject Matter Expertise	100%				100%				0%				0%				0%			
TO 0001 Monthly Project Reviews																				

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Corrosion Policy and Oversight				
DoD 5000-Series Review	1	2015	4	2015
Integration of CPC and CPC-Related Policy	1	2015	4	2015
DAG Review	1	2015	4	2015
Corrosion Board of Directors	1	2015	4	2015
DoD Corrosion Prevention and Mitigation Strategic Plan	1	2015	4	2015
USC Engagement	1	2015	4	2015
GAO Engagement	1	2015	4	2015
Corrosion Technology Implementation Projects Support	1	2015	4	2015
Training Gap Analysis	1	2015	4	2015
Corrosion Website Sustainment	1	2015	4	2015
Product Introduction and Qualification Tool	1	2015	4	2015
Facilitate/Support Corrosion Events	1	2015	4	2015
International Corrosion Partnerships and Engagements	1	2015	4	2015
Programmatic Support	1	2015	4	2015
Technical Corrosion Collaboration	1	2015	4	2015
Corrosion Technology Support				
Corrosion Prevention and Control Review	1	2015	4	2015
DFARS Support	1	2015	4	2015
Funding Reviews	1	2015	4	2015
Weapon Systems and Infrastructure Oversight Support	1	2015	4	2015
Military Department Corrosion Program Review	1	2015	4	2015

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604016D8Z / *Department of Defense Corrosion Program*	**Project (Number/Name)** P015 / *Corrosion Protection Projects*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Corrosion Technology Implementation Project Reviews	1	2015	4	2015
Corrosion Subject Matter Experts	1	2015	4	2015

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604132D8Z / *Missile Defeat Project*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	45.000	-	45.000	46.000	0.000	0.000	0.000	Continuing	Continuing
P072: *Missile Defeat Project*	-	0.000	0.000	45.000	-	45.000	46.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 000

Note

This is a new program element in FY 2017. Previous funding was through various FY 2014, FY 2015, and FY 2016 OUSD program elements.

A. Mission Description and Budget Item Justification

The Missile Defeat Project counters the growing global advancement and proliferation of road-mobile ballistic missile threats. This effort develops and integrates new capability and architectures to optimize fielded weapon systems and C4ISR to defeat these emerging threats.

The Missile Defeat Project coordinates and integrates DoD and Intelligence Community (IC) efforts to develop counter threat capability. This effort measures the effectiveness of new architectures and revolutionary concepts against evolving threats by working with the IC, Combatant Commands, government labs, program offices, industry, and academia.

To meet this challenge the Missile Defeat Project leverages existing test and simulated environments to perform analysis of industry and government reference concepts and architectures to provide innovative technical solutions for missile defeat. We are developing virtual and physical testbeds to robustly test, evaluate, and prototype architectures and assess its ability to improve time critical targeting and defeat of road-mobile threats. The virtual testbed complements testing at physical ranges by providing an infrastructure for addressing different training, test, and evaluation needs. In addition, this effort includes systems engineering and analysis to devolve technical requirements, identify promising solutions, and inform future investment decisions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604132D8Z / *Missile Defeat Project*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	45.000	-	45.000
Total Adjustments	0.000	0.000	45.000	-	45.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	45.000	-	45.000

Change Summary Explanation

The FY 2017 funding adjustment is a result of creating a new Missile Defeat program element, 0604132D8Z.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604132D8Z / *Missile Defeat Project*	Project (Number/Name) P072 / *Missile Defeat Project*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P072: *Missile Defeat Project*	-	0.000	0.000	45.000	-	45.000	46.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 000

Note

This is a new program element in FY 2017. Previous funding was through various FY 2014, FY 2015, and FY 2016 OUSD program elements.

A. Mission Description and Budget Item Justification

The Missile Defeat Project counters the growing global advancement and proliferation of road-mobile ballistic missile threats. This effort develops and integrates new capability and architectures to optimize fielded weapon systems and C4ISR to defeat these emerging threats.

The Missile Defeat Project coordinates and integrates joint DOD and Intelligence Community (IC) efforts to develop counter threat capability solutions in five key areas: 1) dynamic command and control; 2) intelligence, surveillance and reconnaissance; 3) responsive conventional counterforce; 4) national missile defense; and 5) an enduring demonstration and experimentation capability to integrate and measure the effectiveness of developed solutions. This effort will evaluate and assess innovative and creative solutions by partnering with the IC, Combatant Commands, government labs, program offices, industry and academia. Previous investments resulted in multiple industry and government reference concepts which informed decisions for concept development and demonstration.

The Missile Defeat Project performs system engineering, integration, and modeling and simulation in support of the development of a set of system architectures in FY 2017 and FY 2018. Systems engineering updates threat requirements for systems analysis and trade studies. In addition, it develops integrated capability assessments with updated architectures and threat scenarios, defines and allocates options, expands functionality, and incorporates exercise results for missile defeat enterprise M&S tools. The end-to-end systems engineering informs capability investments and requirement allocations across the missile defeat enterprise.

The testbeds provide robust test, evaluation, and prototyping infrastructure and assessments in support of OSD AT&L system engineering of time critical targeting efforts. Building on previous investments, the virtual testbed will complement testing at physical ranges by providing an infrastructure for addressing different training, test, and evaluation needs. In addition, ground, flight and open air testing will be performed to validate models and simulation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Previous Missile Defeat Project efforts	-	-	45.000
Description: The Missile Defeat Project will address the growing global advancement and proliferation of ballistic missile threats through development of counter threat capability solutions that monitor, coordinate and integrate the Department of Defense (DoD) efforts. Missile Defeat is integrating existing capacity and identifying and developing new capabilities to address these threats.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604132D8Z / *Missile Defeat Project*	**Project (Number/Name)** P072 / *Missile Defeat Project*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
FY 2017 Plans: - In FY 2017, Missile Defeat Project will focus on development, integration and testing in five key areas: - Dynamic command and control - Intelligence, surveillance and reconnaissance - Responsive conventional counterforce - National missile defense - Enduring demonstration and experimentation capability - Expand the time critical targeting end-to-end simulation to model additional architecture elements and functions. - Perform systems engineering to deliver initial overarching technical requirements documentation and analysis for candidate architectures. - Deliver detailed test objectives, test event planning, and post-test evaluation for time critical targeting test events in FY 2017.			
Accomplishments/Planned Programs Subtotals	-	-	45.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The acquisition strategy consists of partnering with small businesses, industry, Federally Funded Research and Development Centers and University Affiliated Research Centers. OSD will leverage DoD, the Intelligence Community, and government model-based assessments to inform Better Buying Power philosophy acquisition decisions.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604132D8Z / *Missile Defeat Project*	Project (Number/Name) P072 / *Missile Defeat Project*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
VARIOUS	C/TBD	MULTI : MULTI	-	-		-		45.000		-		45.000	-	-	-
		Subtotal	-	-		-		45.000		-		45.000	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		45.000		-		45.000	-	-	-

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604132D8Z / *Missile Defeat Project*	**Project (Number/Name)** P072 / *Missile Defeat Project*

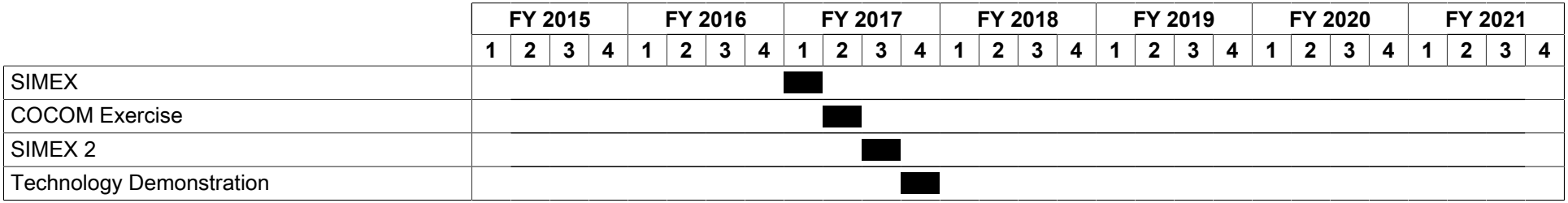

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604132D8Z / *Missile Defeat Project*	**Project (Number/Name)** P072 / *Missile Defeat Project*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SIMEX	1	2017	1	2017
COCOM Exercise	2	2017	2	2017
SIMEX 2	3	2017	3	2017
Technology Demonstration	4	2017	4	2017

Note

Missile Defeat Project experimentation and demonstration will include time critical targeting test events, focused capability demonstrations, capability insertion in warfighter events, and capability insertion into Service and Agency test events.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	125.811	170.872	468.881	844.870	-	844.870	544.547	345.708	110.300	0.000	Continuing	Continuing
P250: *Advanced Innovative Technologies*	125.811	170.872	468.881	844.870	-	844.870	544.547	345.708	110.300	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Strategic Capabilities Office (SCO) identifies, analyzes, demonstrates, and transitions game-changing applications of existing and near-term technology (and other U.S. Government capabilities) to shape and counter emerging threats. Currently focused on the Asia-Pacific Rebalance, SCO combines capability innovation with concepts of operation and information management to develop novel concepts often crossing Service, Defense-Intelligence, and multi-classification divides. This helps to solve critical national security challenges in partnership with the Services, Defense Agencies, Combatant Commands (COCOMS), Joint Chiefs of Staff, Intelligence Community, and the Office of the Secretary of Defense (OSD). SCO analyzes, demonstrates, and red-teams these concepts on an accelerated time frame to enable subsequent programmatic decisions on alternative capabilities that have greater mission impact and lower cost.

The Advanced Innovative Technologies Program Element (PE) contains projects that include in-depth analysis to determine technical and operational performance and risk, component and subsystem-level prototyping and testing to reduce risk, and operational demonstrations to prove concept viability prior to subsequent programmatic decisions. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	174.752	469.798	422.206	-	422.206
Current President's Budget	170.872	468.881	844.870	-	844.870
Total Adjustments	-3.880	-0.917	422.664	-	422.664
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.812	-			
• Other Internal Baseline Adjustment	-	-	433.618	-	433.618
• FY15 Reprog. for Cancelled Account	-0.068	-	-	-	-
• FFRDC Reduction	-	-0.917	-	-	-
• Efficiency Reductions	-	-	-7.723	-	-7.723
• Economic Assumptions	-	-	-3.231	-	-3.231

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD Bills.

This update reflects continued project funding in FY 2017 for six SCO projects: Land-Based Rail Gun (LBRG) and Land-Based and Sea-Based Powder Guns, Advanced Navigation, Enhanced Munitions, Sea Dragon, Unmanned Aerial Vehicle Payloads, and Sea Mob.

The FY 2017 funding request includes reduction of $18.770 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604250D8Z / *Advanced Innovative Technologies*	Project (Number/Name) P250 / *Advanced Innovative Technologies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P250: *Advanced Innovative Technologies*	125.811	170.872	468.881	844.870	-	844.870	544.547	345.708	110.300	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Strategic Capabilities Office (SCO) identifies, analyzes, demonstrates, and transitions game-changing applications of existing and near-term technology (and other U.S. Government capabilities) to shape and counter emerging threats. Currently focused on the Asia-Pacific Rebalance, SCO combines capability innovation with concepts of operation and information management to develop novel concepts often crossing Service, Defense-Intelligence, and multi-classification divides. SCO helps to solve critical national security challenges in partnership with the Services, Defense Agencies, Combatant Commands (COCOMS), Joint Chiefs of Staff, Intelligence Community, and the Office of the Secretary of Defense (OSD). SCO analyzes, demonstrates, and red-teams these concepts on an accelerated time frame to enable subsequent programmatic decisions on alternative capabilities that have greater mission impact and lower cost.

The Advanced Innovative Technologies Program Element (PE) contains projects that include in-depth analysis to determine technical and operational performance and risk, component and subsystem-level prototyping and testing to reduce risk, and operational demonstrations to prove concept viability prior to subsequent programmatic decisions. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Hypervelocity Gun Weapon System (HGWS)	95.447	268.711	246.070
Description: The title of "Land-and-Sea-Based Powder Guns", has been changed to "Hypervelocity Gun Weapon System" because base defense solutions developed under this PE can be applied to multiple guns and gun types launching the Hypervelocity Projectile. Cost-effective, large magazine base defense will be demonstrated by closing the fire control loop between existing sensors and prototype projectiles launched from existing powder guns including the Navy's Mk-45 five inch Naval gun and the Army's Paladin 155 mm self-propelled howitzer; advanced powder gun prototypes; and the electromagnetic railgun. To facilitate this, the program will integrate guns, projectile, and sensor so that projectiles may be command guided during a series of flight tests. These tests will verify performance and lethality results from modeling and simulation. Testing will conclude by demonstrating projectile fly-out and control, sensor tracking of projectiles, communication from sensor to projectile, integrated guidance, navigation and control, culminating in FY 2016 live-fire, closed-loop launches high velocity, and live-fire tests against live targets in FY 2017. The intended end-state is a prototype system that retires risks to allow transition of gun based defense to partners: the Missile Defense Agency, the Navy, and, or the Army.			
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Successfully fired three prototype projectiles from Mk-45 powder gun to test inertial measurement units and data link under development by Sandia National Laboratories. • Conducted hardware in the loop test of proof-of-principle fire control radars and began integration with fire control. • Completed a Railgun prototype mount analysis of alternatives review and mount conceptual design review with BAE. • Tested launch survivability of projectile, including data link from 32 MJ Railgun. • Took delivery of two proof-of-principle fire control radars and started testing and integration at Potomac River Test Range. • Initiated Powder Gun Acceleration effort with U.S. Army to integrate High Velocity Projectile (HVP) into and conduct closed loop fire control tests with existing and developmental artillery guns. • Initiated Super Powder Gun effort with U.S. Army to achieve higher muzzle velocities than existing artillery guns. • Accelerated BAE hypervelocity projectile development and testing. • Initiated parallel projectile risk reduction and advanced projectile design initiatives to broaden industry base. • Completed fire control system requirements review, Demonstration Objectives Review and System Concept and Design Review to support FY 2016 tests. • Modified Mk-160 software and integrate data link to enable closed loop fire control for testing of prototype projectiles. • Investigated and tested alternative lethality methods. • Completed informal preliminary and critical design review for GD-OTS control actuator system. • Developed notional (National Security Agency (NSA) requirements pending) security module design and built 30 for gun hardening and system integration. • Characterized government designed inertial measurement units under representative environmental conditions. • Delivered Mk 99 propellant, interior ballistic modeling support, and validated models with flight test. • Delivered ground data link for fire control hardware integration. • Completed informal system requirements and function review for BAE tail-kit. • Began formal security module certification process with NSA and completed information assurance requirements review.			
FY 2016 Plans: • Conduct initial live-fire projectile launch from Army 155 mm powder gun. • Conduct a control actuation system test from high velocity guns. • Test maneuvering projectile capabilities in hardware-in-the-loop at Johns Hopkins University Applied Research Lab (JHU/APL) and gun live-fire demonstrations at White Sands Missile Range (WSMR). • Conduct closed-loop live-fire testing at high velocity launch against synthetic targets. • Conduct High Velocity Projectile (HVP) launch from U.S. Army artillery guns with optimized charge and verify HVP component survivability and communication. • Continue parallel projectile risk reduction and advanced projectile design initiatives and down select to advanced designs for further development.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Continue prototype fire control sensor development with Georgia Tech Research Institute (GTRI) to support closed loop fire control tests beginning in FY 2018. • Begin procurement of prototype fire control sensor hardware and begin integration for live fire testing beginning in FY 2018. • Begin procurement of surveillance sensor hardware and begin integration for live fire testing beginning in FY 2018. • Begin procurement of targets to be used in FY 2017 and FY 2018 tests. • Support projectile testing for HGWS tests with equipment and facilities at WSMR. • Continue Powder Gun Acceleration effort with U.S. Army. • Continue Super Powder Gun effort with U.S. • Complete concept of operations analysis for powder gun defense with Army and Navy transition partners. • Continue system requirements document and system design document to support live fire testing beginning in FY 2017. • Evolve projectile data link to revised interfaces, including tactical data link frequency bands. • Continue to work security module certification with the NSA through preliminary design review and support integration and testing with 73 security modules. • Continue to provide Mk 99 propellant for flight tests. • Build government-designed projectiles for FY 2016 and FY 2017 testing. • Continue to anchor Naval Surface Warfare Center - Dahlgren, Division (NSWCDD), Missile and Space Intelligence Center (MSIC), and JHU/APL models and simulations with test data. ***FY 2017 Plans:*** • Demonstrate lethality of High Velocity Projectile (HVP) kinetic warhead. • Use Hardware in the Loop at JHU/APL to test closed loop system performance. • Conduct initial closed-loop live-fire testing against surrogate threat. • Conduct prototype fire control sensor Critical Design Review (CDR) with Georgia Tech Research Institute (GTRI). • Continue procurement of prototype fire control sensor hardware and begin integration for live fire testing beginning in FY 2018. • Continue procurement of surveillance sensor hardware and begin integration for live fire testing beginning in FY 2018. • Continue parallel projectile risk reduction and advanced projectile design initiatives and down select to an advanced design for flight test. • Continue system requirements document and system design document to support live fire testing. • Conduct site development activities at Pacific test site. • Continue procurement of test targets for live fire testing beginning in FY 2018. • Continue to anchor NSWC/DD, MSIC, and JHU/APL models and simulations with test data.			
Title: Assured Tactical C2 (ATC2)	29.280	14.473	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Leverage existing technologies to analyze and demonstrate an alternative Tactical Command and Control solution for contested environments. Project will apply existing Department of Defense (DoD) investments in novel ways to increase tactical command and control reliability in contested environments. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. This project will transition to services in FY 2017. ***FY 2015 Accomplishments:*** • Conducted design reviews and operational technology exchanges to incorporate Army, Air Force, and Navy tactical cloud requirements into an integrated, secure, assured capability. • Acquired hardware, software, and test design solutions and evaluate components in a trusted environment. • Began design and prototyping for subsequent proof-of-principle demonstrations by leveraging existing commercial cloud technology and techniques to enhance Services, cloud development and integrate into development baselines. • Began development of enhanced security and vulnerability assessments. • Completed baseline version 1.0 of Tactical Cloud Reference Implementation to be used in FY 2016 demonstration. ***FY 2016 Plans:*** •Continue further development of enhanced security and vulnerability assessments. •Unify the various tactical Service clouds into an integrated, secure, and assured operational environment that provides reliable communications and robust security for the tactical warfighter. • Demonstrate tactical cloud capabilities at Trident Warrior 16.			
Title: Advanced Navigation ***Description:*** Leverage existing technologies to analyze and demonstrate a prototype advanced navigation technique for contested environments. Projects will 1) develop a capability to create software that enables Global Positioning System (GPS) -free navigation of multiple weapon platforms; and 2) demonstrate capability for Small Diameter Bomb (SDB)–I to perform in a GPS-contested/denied environment to near GPS accuracy. If this capability works then COCOMs will be able to use the GPS-dependent SDB-I in a GPS-denied environment. ***FY 2015 Accomplishments:*** FY 2015 accomplishments included design, prototyping, data collections, and tests. Test results used to anchor modeling and simulation performance results and develop operationally-relevant proof-of-principle demonstrations. • Analyzed options for mounting a sky-ward looking camera for navigation. • Purchased prototype hardware, performed integration analysis of existing unmanned platform and conducted ground tests of commercial off the shelf cameras.	15.909	16.474	3.350

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Modeled and analyzed sensor size, accuracy, detection range, and sensitivity to object brightness; determined day and nighttime sensor performance. • Developed design concepts for form/fit replacement for LN-120G. • Developed a plan to integrate GPS-free navigation capability into the Small Diameter Bomb (SDB)-I. • Analyzed navigation accuracy and risks of a SDB-I using a non-GPS, image-based navigation technique. ***FY 2016 Plans:*** Advanced Navigation Common Capability Demonstration: • Define software development requirements and preliminary software design. • Evaluate software – hardware compatibility in a captive carry flight test. Small Diameter Bomb-I Demonstration: • Model image-based navigation performance. • Model SDB-I performance when using image-based navigation. • Define system requirements and preliminary system design. • Begin test planning for demonstrations in FY 2017. • Define the interface between image-based navigation software and SDB-I sensor hardware. • Order four Guided Test Vehicles (GTVs) (inert bombs used for test) to be dropped in FY 2017 demonstrations. • Build two of six image-based navigation software updates. • Test SDB-I sensor hardware in captive-carry test. ***FY 2017 Plans:*** Advanced Navigation Common Capability Demonstration: • Determine baseline design of software development tools, flight software, and flight hardware. • Conduct captive-carry flight test of baseline hardware and software. • Conduct captive-carry system flight demonstration. Small Diameter Bomb-I Demonstration: • Build remaining four of six image-based navigation software updates. • Conduct functional qualification testing of hardware and software for flight test. • Test SDB-I sensor hardware and navigation software in captive-carry test. • Drop three guided test vehicles (SDB-I configured for testing) to demonstrate weapon accuracy using sensor hardware and navigation software.			
Title: Intelligence, Surveillance, and Reconnaissance (ISR) Denial	19.787	19.470	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Leverage existing technologies to analyze and demonstrate a prototype solution to disrupt enemy targeting of critical U.S. assets. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. This project will transition to the Navy in FY 2017. ***FY 2015 Accomplishments:*** • Initiated collaboration across DoD laboratories on potential ISR denial solutions. • Identified trade space between different technical approaches. • Completed ISR Critical Design Review (CDR). • Purchased and integrated hardware which supports CDR design. • Conducted modeling and simulation analysis of potential solutions to better understand performance and potential trade-offs for development decisions and Concept of Operations (CONOPS). • Performed initial testing of the system to validate system performance. • Began work on modeling and simulation efforts to better inform CONOPS development. • Began preliminary efforts to ensure integration with related efforts. ***FY 2016 Plans:*** • Purchase and integrate hardware which supports Critical Design Review (CDR) design. • Conduct modeling and simulation analysis of potential solutions to better understand performance and potential trade-offs for development decisions and Concept of Operations (CONOPS). • Complete integration of individual subsystems. • Conduct system testing to validate performance. • Conduct sea based testing on USS EISENHOWER (CVN-69) during flight operations. • Initiate development of training program in support of 2017 Navy transition.			
Title: Enhanced Munitions ***Description:*** Leverage existing technologies to analyze and prototype enhancements to current munitions. As existing munitions age, leveraging advanced technology may enhance or buy-back performance, this project will retire risks associated with transition of enhanced munitions. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2015 Accomplishments:*** • Conducted system modeling, simulation, and prototype performance trades. • Performed analysis and subsystem testing to develop operationally-relevant proof-of-principle demonstrations. • Pursued target component modeling, simulation, and vulnerability testing.	10.449	23.474	41.960

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Verified target component vulnerability and anchor component models. • Developed target engagement requirements. • Initiated design and build of surrogate target. ***FY 2016 Plans:*** • Complete a Preliminary Design Review (PDR) and down select from multiple prototype designs. • Build a prototype (size, weight, and power constrained) for enhanced munitions. • Integrate components into a target surrogate and perform vulnerability testing to anchor models and simulations. • Test prototype capability against target surrogate to verify effectiveness. ***FY 2017 Plans:*** • Complete a Critical Design Review (CDR). • Build and test form factor enhancement article. • Integrate enhancement into munitions test article. • Finalize Critical Experiment flight test plan.			
Title: Sea Dragon ***Description:*** A cost-effective disruptive offensive capability will be demonstrated by integrating an existing weapon system with an existing Navy platform. Project includes analysis, prototyping, and experimentation. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2016 Plans:*** • Complete Phase Zero Analysis and Planning. • Complete Phase One Development and Land Based Testing (LBT). • Begin Phase Two Underwater Static Testing (UST). • Analyze off-board targeting options to close operationally relevant kill chains. • Prepare test facilities and weapon firing ranges for subsequent testing. • Identify and analyze alternative targeting methods to enable down select and follow on demonstrations. • Procure long lead range test articles. • Initiate planning to demonstrate use of various targeting methods. • Continue detailed studies on platform, fire control and weapon integration and interoperability in support of future end to end demonstration (FY 2020). • Begin studies on platform, fire control and weapon integration and interoperability in support of future tactical system. • Continue to reduce time latency from sensor to shooter for off board targeting. ***FY 2017 Plans:***	-	81.114	70.760

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Complete Phase Two Underwater Static Testing. • Start Phase Three Underwater Translational Testing (UTT)) to include: • Complete analysis of off-board targeting options to close operationally relevant kill chains. • Prepare test facilities and weapon firing ranges for subsequent testing. • Identify and analyze alternative targeting methods to enable down select and follow on demonstrations. • Conduct hardware-in-the-loop sub-system kill chain testing. • Continue procurement of long lead range test articles. • Initiate planning to demonstrate use of various targeting methods. • Refine studies on platform, fire control and weapon integration and interoperability in support of Phase Four End to End Demonstration (FY 2019).			
Title: Unmanned Aerial Vehicle Payloads	-	25.065	26.230
Description: SCO will leverage existing low-cost payloads by demonstrating autonomous swarming behavior of a large number of Unmanned Aerial Vehicles (UAVs) (e.g. micro-UAVs) as well as focused upgrades of the low cost Miniature Air-Launched Decoy (MALD) platform (MALD-X). This project seeks to demonstrate the operational effectiveness and tactical advantage provided by large numbers of collaborative, expendable platforms. Effectiveness analysis and prototyping of these payloads will be conducted, with initial demonstrations planned in FY 2016 completing with final free flight demonstrations of the MALD-X prior to potential transition to a program of record. This project was funded in FY 2015 within the Advanced Innovative Analysis and Concepts Program Element 0603289D8Z under the Low-Cost Payloads project. Due to the nature of some of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2016 Plans:*** • Conduct Micro-UAV Swarm demonstration. • Complete MALD-X critical design review. • Conduct initial prototype subsystem testing. • Anchor modeling and simulations and update operational effectiveness assessment. ***FY 2017 Plans:*** • Conduct platform/vehicle level ground testing. • Conduct vehicle level Captive Carry Flight Testing. • Build, integrate and checkout flight test vehicles. • Complete flight test demonstrations. • Update modeling and simulations based on completed testing and update operational effectiveness assessment.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Complete prototype development and testing in partnership with service program offices to speed transition to a program of record.			
Title: Sea Mob ***Description:*** SCO, in partnership with the Office of Naval Research (ONR), is developing a group of Unmanned Surface Vehicles (USVs) capable of cooperative swarming behaviors. This project will demonstrate the ability to generate common situational awareness among USVs and conduct coordinated dynamic planning required for sustaining cooperative behaviors. Sea Mob and ONR are working closely together on USV swarm development activities, building on a series of successively more complex demonstrations planned over the next several years to advance the capabilities and prove utility of swarming USVs for multiple missions. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2016 Plans:*** • Demonstrate long range autonomy for one USV to verify range and the robustness of hardware and software in an open ocean environment. • Work with ONR to refine algorithms for contact fusion, dynamic planning and task execution of cooperative behaviors of USVs. • Acquire, install, integrate and test swarm subsystems on five USVs, including sensors, navigation, communications, and autonomy. • Plan for more complex cooperative behavior demonstrations that include additional sensors, more robust navigation, and reliable communications. ***FY 2017 Plans:*** • Integrate and test swarm subsystems on five USVs, including sensors, navigation, communications, and autonomy. • Demonstrate a tactical mission using a swarm of five USVs that includes long range transit while sensing, fusing and avoiding contacts and hazards. • Analyze and develop USV swarm tactics, techniques and procedures for specified, complex missions. • Acquire, install, integrate and test swarm subsystems on additional USVs, including sensors, navigation, communications, and autonomy. • Develop the capability to deliver a large swarm of USVs and initiate swarm behaviors from forward locations, including open ocean. • Develop and test cooperative behaviors among larger USV swarms to conduct complex missions, such as autonomous search and identification, human-in-the-loop decision making, and delivery of advanced payloads.	-	20.100	18.120
Title: Command and Control of the Information Environment ***Description:*** The Command and Control of the Information Environment (C2IE) project provides Combatant Commands, Services, Agencies, and Department of Defense leadership the ability to detect, monitor, understand, and act in the information	-	-	31.880

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
environment. The C2IE project leverages commercial and other existing software tools to enable dynamic understanding of the information environment. C2IE will improve the warfighters ability to sense, understand, and visualize the information environment, and collaboratively plan and execute activities that contribute to U.S. Government shaping efforts. Due to the nature of this project, specific applications and detailed plans are available at a higher classification level. The Command and Control of the Information Environment project transitions in FY 2017 from the Advanced Innovative Analysis and Concepts Program Element (PE) 0603289D8Z. ***FY 2017 Plans:*** • Demonstrate near real time analysis of unclassified data sources on a single platform. • Complete initial assessment of performance for four analytic components. • Complete initial installation/demonstration of C2IE components on two SIPR networks. • Perform developmental, operational, and interface testing of C2IE software. • Initiate development of Tactics Techniques & Procedures (TTP) for use of developed analytics. • Continue incremental SW development of information Common Operational Picture (iCOP), and Situational Awareness (SA) components of C2IE. • Conduct multiple validation demonstrations and workshops for various Combatant Commanders (CCMDs). • Initiate assessment of C2IE integration into GCCS-J/GCCS-J future.			
Title: Alternative Strike ***Description:*** The Alternative Strike demonstration integrates existing weapons, launch platforms, and command and control structures in novel ways to quickly provide the Combatant Commanders with critical multi-mission capabilities. This project will demonstrate the feasibility and utility of launching existing/modified weapons from existing launch platforms. This project will retire risks associated with cross platform integration to enable transition of new weapon/system combinations to service partners. System design and long-lead acquisition will be initiated in FY 2017, leading to subsequent demonstrations in FY 2018 through FY 2020. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2017 Plans:*** • Complete a Preliminary Design Review (PDR) for platform integration and down select from multiple prototype designs. • Conduct aerodynamic modeling and simulation of weapon release and fly out. • Conduct detailed design of launch platform modifications for weapon integration. • Conduct detailed design of weapon modifications for new mission. • Design communications architecture for weapons targeting and in-flight support. • Finalize test plan for FY 2018 through FY 2020 testing.	-	-	198.030

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Complete a Critical Design Review (CDR) of entire weapon/platform/communications design.			
Title: Strike-Ex ***Description:*** The Strike-Ex project leverages existing strike capabilities and develops alternative Concepts of Employment (CONEMP) and Tactics, Techniques, and Procedures (TTP) to deliver near-term innovative strike capabilities to Combatant Commanders. Due to the nature of this project, specific applications and detailed plans are available at a higher classification level. The Strike-Ex project is expected to transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2017. ***FY 2017 Plans:*** • Conduct detailed design and systems engineering activities in support of system architecture, hardware design and platform integration requirements. • Conduct platform integration test exercises to collect performance data to validate CONOPS and identify risks. • Procure test article hardware to support component level testing and integration. • Initiate fabrication of Strike-Ex test articles to facilitate platform integration evaluations. • Conduct site development activities at White Sands Missile Range. • Develop Interface Control Documents (ICD) to manage integration of systems within Strike-Ex and integration on host platforms.	-	-	121.720
Title: Third Eye ***Description:*** Third Eye is a data architecture that leverages existing and emerging sensors to provide real-time tracking and targeting for multi-Service strike weapons. The project will enhance tracking against hard targets in denied environments and maintain ability to securely communicate with these sensors in real-time. SCO will integrate Third Eye-participating sensors with existing Service architectures to provide a low-cost, survivable real-time tracking and targeting capability to supplement existing sensors. Due to the classified nature of this project, specific applications and detailed plans are available at a higher classification level. Transition effort from SCO Advanced Innovative Analysis and Concepts Program Element (PE) 0603289D8Z. ***FY 2017 Plans:*** • Conduct four spirals of Clutch Shot targeting demonstrations with new sensor capabilities. • Complete low latency fusion algorithms development. • Finalize analysis of new sensor data types for improved data fusion. • Complete build and in-field testing of a special collections sensor. • Complete Upstream Data Fusion (UDF) development and conduct demonstrations/evaluations of improved timeliness. • Complete Clutch Shot architecture development. • Develop updates to Mission Planning for Weapons/Tactical Employment guides for using new off board sensors.	-	-	33.810

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Augment service's experimentation with Third Eye capabilities. • Conduct integration and testing of Third Eye capabilities into additional services processing and dissemination systems.			
Title: Sea Stalker ***Description:*** SCO will leverage existing low cost, persistent maritime platforms to offer Combatant Commanders (CCMDs) deterrence options during a crisis. The Sea Stalker project seeks to retire the risk of platform and payload integration to provide an immediate, flexible capability. The project includes modeling, analysis, prototyping, and testing. The intended end-state is a prototype system that retires all risks necessary to allow transition to Navy partners. This project is currently funded within the Advanced Innovative Analysis and Concepts Program Element 0603289D8Z and will transition to the Advanced Innovative Technologies Program Element 0604250D8Z in FY 2017. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level. ***FY 2017 Plans:*** • Manufacture and test integrated platform/payload systems. • Develop command and control algorithms and power management plan necessary for operation. • Perform platform testing in operationally relevant scenarios. • Test payload design and quantify effectiveness against mission goals. • Continue detailed concept of operation analysis.	-	-	17.390
Title: MK-48 Heavyweight Torpedo Prototyping ***Description:*** SCO will prototype and test MK-48 Heavyweight Torpedo Prototypes including modular payloads, communications, and advanced propulsion concepts. ***FY 2017 Plans:*** SCO will prototype and test MK-48 Heavyweight Torpedo Prototypes to include: • modular payloads • communications • advanced propulsion concepts.	-	-	35.550
Accomplishments/Planned Programs Subtotals	170.872	468.881	844.870

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics are specific to each of the SCO efforts funded under the Advanced Innovative Technologies Program Element. All of which include measures identified in the management approach, Statement of Work (SOW) and Period of Performance (POP). In addition, completions and successes are monitored against schedules and deliverables stated in the initiative's management approach. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypervelocity Gun Weapon System (HGWS)	IA	Sandia : NM	3.822	1.572	Mar 2015	4.687	Oct 2015	4.496		-		4.496	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	SOSSEC : NJ	42.029	26.099	Jan 2015	16.330	Oct 2015	7.284		-		7.284	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	DOTC : NJ	19.326	22.283	Feb 2015	42.812	Oct 2015	26.180		-		26.180	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	PEO IWS 7.0 : VA	-	16.849	Mar 2015	26.163	Oct 2015	87.392		-		87.392	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	MDA / GTRI : AL, GA	18.388	6.288	Jan 2015	8.000		50.856		-		50.856	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	MDA / Parsons : AL, VA	16.528	1.048		52.509		1.575		-		1.575	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	US ARMY : Various	4.373	10.048	Jan 2015	17.250	Oct 2015	42.093		-		42.093	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	Defense Microelectronics Activity (DMEA) : Various	20.843	11.260	Jan 2015	1.430	Oct 2015	24.838		-		24.838	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	Air Force Life Management Center (AFLCMC) - Hanscom AFB, Massachusetts Institute of Technology / Lincoln Laboratory (MIT / LL) : MA	0.502	-		53.475	Oct 2015	1.356		-		1.356	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	NAVSEA , Johns Hopkins Advanced Research Laboratory : DC, MD	-	-		9.364		-		-		-	-	-	-
		Subtotal	125.811	95.447		232.020		246.070		-		246.070	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Assured Tactical C2	MIPR	ONR, NRL, AFRL, ARL : DMV	-	29.280	Oct 2014	14.473	Oct 2015	-		-		-	-	-	-
Advanced Navigation	MIPR	MIT/LL : MA	-	1.600	Oct 2014	-		-		-		-	-	-	-
Advanced Navigation Software Development	MIPR	MIT/LL : MA	-	1.400	Apr 2015	-		-		-		-	-	-	-
Advanced Navigation	MIPR	AFLMC : FL	-	12.909	Feb 2015	16.359	Oct 2015	3.350		-		3.350	-	-	-
Intelligence, Surveillance, and Reconnaissance (ISR) Denial	MIPR	JHU/APL : MD	-	19.787	Oct 2014	19.470	Oct 2015	-		-		-	-	-	-
Enhanced Munitions	MIPR	MSIC, MDA : AL, VA	-	10.449	Nov 2014	23.474	Oct 2015	41.960		-		41.960	-	-	-
Sea Dragon	MIPR	IWS, NAVSEA, NUWC, SPAWAR, NAVAIR & JHU/ APL : Various	-	-		81.000	Oct 2015	70.760		-		70.760	-	-	-
Unmanned Aerial Vehicle Payloads	MIPR	MIT/LL, SSC Pacific, NAWCWD : Various	-	-		24.033	Oct 2015	26.230		-		26.230	-	-	-
Sea Mob	MIPR	NSWC/CCD, NSWC/ PCD, JHU/APL, PSU/ARL, JPL : Various	-	-		19.985	Oct 2015	18.120		-		18.120	-	-	-
Command and Control of the Information Environment	MIPR	Army Research Laboratory : MD	-	-		-		31.880		-		31.880	-	-	-
Alternative Strike	MIPR	John Hopkins University / Advanced Physics Lab) (JHU/APL) : MD	-	-		-		198.030		-		198.030	-	-	-
Strike-Ex	MIPR	U. S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) & Naval	-	-		-		121.720		-		121.720	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Surface Warfare Center, Carderock Division (NSWCCD) : AL & MD													
Third Eye	MIPR	Naval Systems Management Activity (NSMA), Naval Research Laboratory - NRL : DC, MA, VA	-	-		-		33.810		-		33.810	-	-	-
Sea Stalker	MIPR	Various : TBD	-	-		-		17.390		-		17.390	-	-	-
MK-48 Heavyweight Torpedo Prototyping	MIPR	Various : TBD	-	-		-		35.550		-		35.550	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	SOSSEC : NJ	-	-		20.699		-		-		-	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	Naval Surface Warfare Center Port Hueneme Division (NSWC PHD), WSMR : CA	-	-		13.053		-		-		-	-	-	-
Hypervelocity Gun Weapon System (HGWS)	MIPR	NSWCDD : Dahlgren, VA	-	-		4.315		-		-		-	-	-	-
		Subtotal	-	75.425		236.861		598.800		-		598.800	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	125.811	170.872		468.881		844.870		-		844.870	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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	FY 2008				FY 2009				FY 2010				FY 2011				FY 2012				FY 2013				FY 2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Railgun Command Projectile Maneuvers																												
Railgun Command Projectile Maneuvers																												
Railgun Airframe Flight																												
Railgun Airframe Flight																												
Railgun Prototype Mount CDR																												
Railgun Prototype Mount CDR																												
Railgun SRD																												
Railgun SRD																												
Railgun Install Tracker Hardware and Track Projectile																												
Install Railgun Tracker Hardware and Track Projectile																												
Railgun Decision to proceed with Prototype Testing																												
Decision to proceed w/ Railgun Prototype Testing																												
Railgun Install Multisensor Hardware/Track Projectile																												
Install Railgun Multisensor Hardware/Track Projectile																												
Railgun Guidance and Control Demonstration																												
Railgun Guidance and Control Demonstration																												
Railgun SDD																												
Railgun SDD																												
Railgun Payload Dispense																												

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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	FY 2008				FY 2009				FY 2010				FY 2011				FY 2012				FY 2013				FY 2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Railgun Payload Dispense																												
Railgun Prototype Mount PDR																												
Railgun Prototype Mount PDR																												
Railgun Proof-of-Principle Fire Control Sensors																												
Railgun Proof-of-Principle Fire Control Sensors																												
Railgun Track Maneuvering Projectile																												
Railgun Track Maneuvering Projectile																												
Railgun Test System at WSMR																												
Install Railgun Test System at WSMR																												
ATC2: Integrate Service Clouds																												
Integrate Service Clouds																												
ATC2: Advanced Security Enabled																												
Advanced Security Enabled																												
ATC2: Red Teaming																												
Red Teaming																												
Advanced Navigation USAF Contract Award																												
USAF Contract Award																												
Advanced Navigation Weapons Drop Tests																												
Weapons Drop Tests																												
ISR Denial Complete CDR																												
Complete CDR																												
ISR Denial Initial Systems Test																												
Initial Systems Test																												
ISR Denial Fleet Demonstration																												

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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	FY 2008				FY 2009				FY 2010				FY 2011				FY 2012				FY 2013				FY 2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Fleet Demonstration																												
Enhanced Munitions Complete PDR																												
Complete PDR																												
Enhanced Munitions Complete CDR																												
Complete CDR																												
Sea Dragon Initial Launch Demonstration																												
Initial Launch Demonstration																												
Sea Dragon Follow-on Launch Demonstration																												
Follow-on Launch Demonstration																												
Unmanned Aerial Vehicle Payloads CDR																												
CDR																												
Unmanned Aerial Vehicle Payloads Swarming Demo																												
Swarming Demo																												
Sea Mob Single Vehicle Autonomy at Extended Range																												
Single Vehicle Autonomy at Extended Range																												
Sea Mob Simple Cooperative Behavior																												
Simple Cooperative Behavior																												
Sea Mob Complex Cooperative Behavior																												
Complex Cooperative Behavior																												

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Railgun Command Projectile Maneuvers																												

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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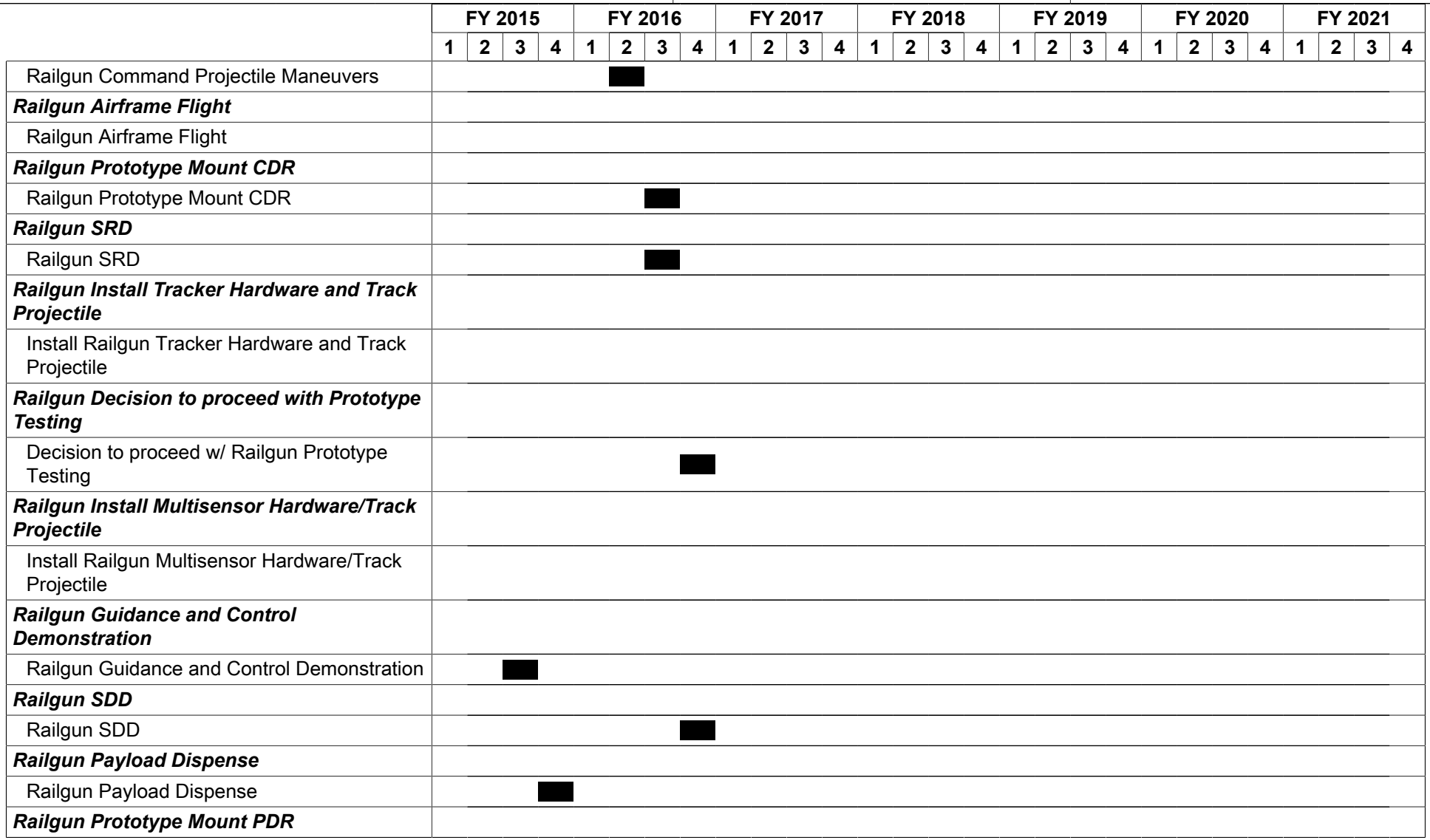

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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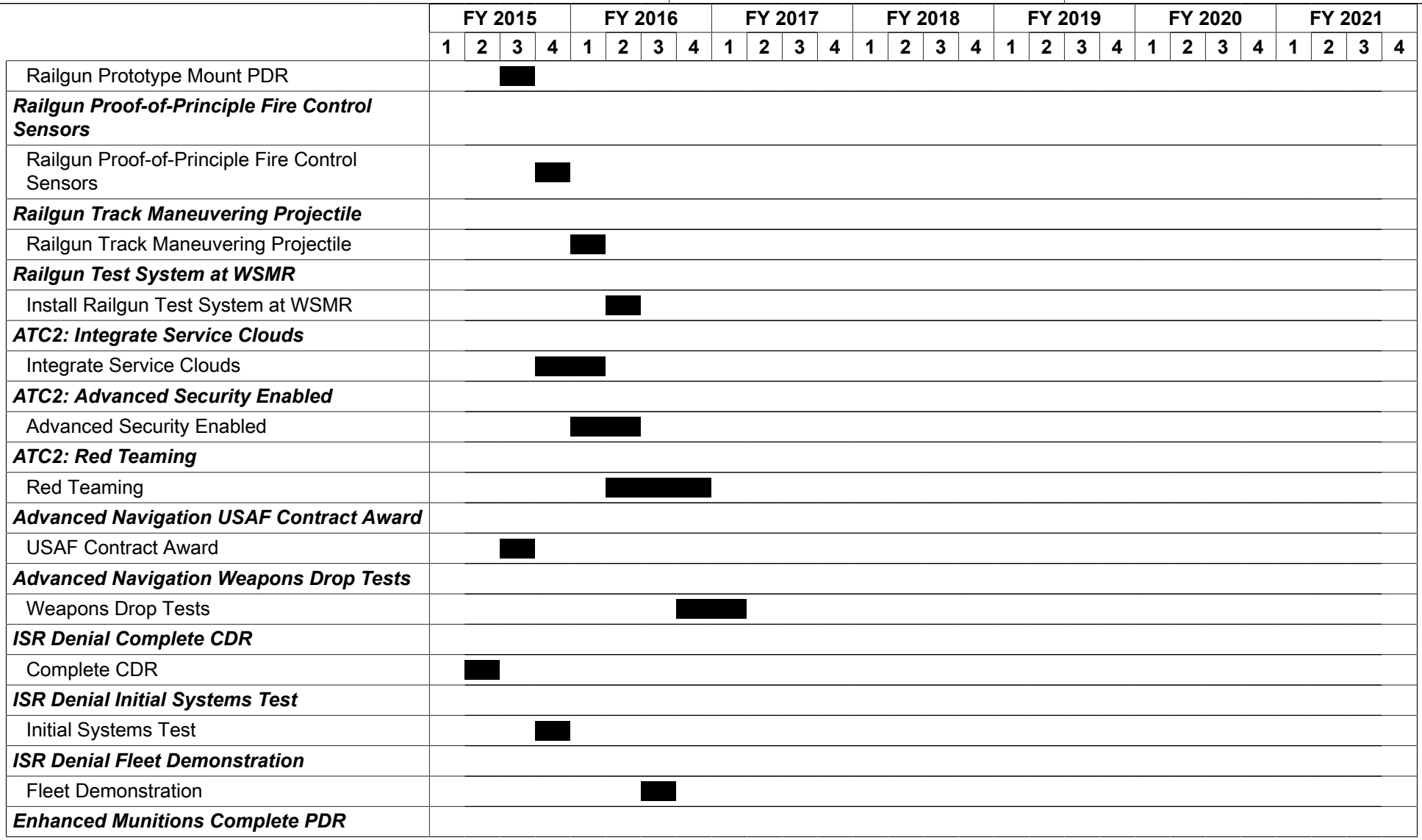

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

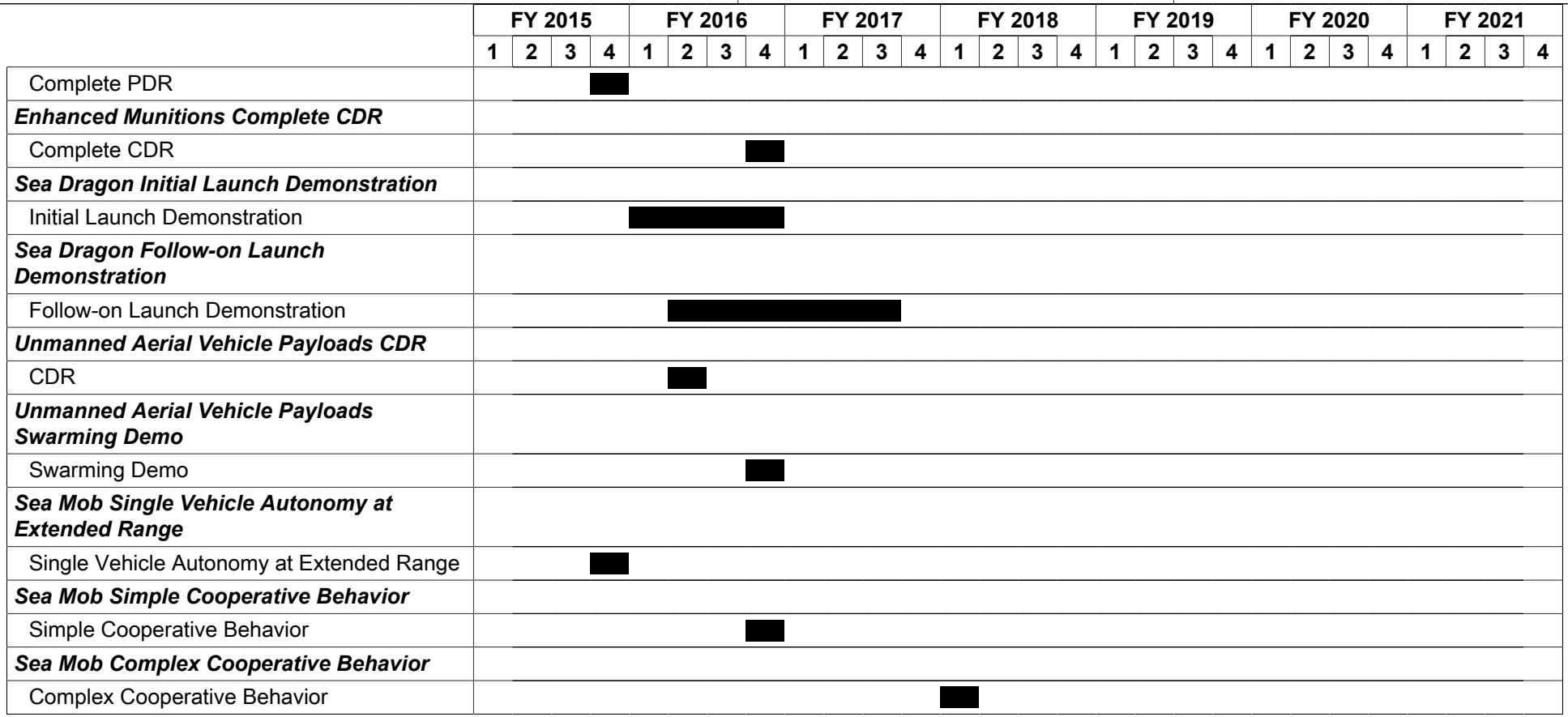

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Railgun Command Projectile Maneuvers				
Railgun Command Projectile Maneuvers	2	2016	2	2016
Railgun Airframe Flight				
Railgun Airframe Flight	1	2014	1	2014
Railgun Prototype Mount CDR				
Railgun Prototype Mount CDR	3	2016	3	2016
Railgun SRD				
Railgun SRD	3	2016	3	2016
Railgun Install Tracker Hardware and Track Projectile				
Install Railgun Tracker Hardware and Track Projectile	1	2014	1	2014
Railgun Decision to proceed with Prototype Testing				
Decision to proceed w/ Railgun Prototype Testing	4	2016	4	2016
Railgun Install Multisensor Hardware/Track Projectile				
Install Railgun Multisensor Hardware/Track Projectile	4	2014	4	2014
Railgun Guidance and Control Demonstration				
Railgun Guidance and Control Demonstration	3	2015	3	2015
Railgun SDD				
Railgun SDD	4	2016	4	2016
Railgun Payload Dispense				
Railgun Payload Dispense	4	2015	4	2015
Railgun Prototype Mount PDR				
Railgun Prototype Mount PDR	3	2015	3	2015

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Railgun Proof-of-Principle Fire Control Sensors				
Railgun Proof-of-Principle Fire Control Sensors	4	2015	4	2015
Railgun Track Maneuvering Projectile				
Railgun Track Maneuvering Projectile	1	2016	1	2016
Railgun Test System at WSMR				
Install Railgun Test System at WSMR	2	2016	2	2016
ATC2: Integrate Service Clouds				
Integrate Service Clouds	4	2015	1	2016
ATC2: Advanced Security Enabled				
Advanced Security Enabled	1	2016	2	2016
ATC2: Red Teaming				
Red Teaming	2	2016	4	2016
Advanced Navigation USAF Contract Award				
USAF Contract Award	3	2015	3	2015
Advanced Navigation Weapons Drop Tests				
Weapons Drop Tests	4	2016	1	2017
ISR Denial Complete CDR				
Complete CDR	2	2015	2	2015
ISR Denial Initial Systems Test				
Initial Systems Test	4	2015	4	2015
ISR Denial Fleet Demonstration				
Fleet Demonstration	3	2016	3	2016
Enhanced Munitions Complete PDR				
Complete PDR	4	2015	4	2015
Enhanced Munitions Complete CDR				

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604250D8Z / *Advanced Innovative Technologies*	**Project (Number/Name)** P250 / *Advanced Innovative Technologies*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Complete CDR	4	2016	4	2016
Sea Dragon Initial Launch Demonstration				
Initial Launch Demonstration	1	2016	4	2016
Sea Dragon Follow-on Launch Demonstration				
Follow-on Launch Demonstration	2	2016	3	2017
Unmanned Aerial Vehicle Payloads CDR				
CDR	2	2016	2	2016
Unmanned Aerial Vehicle Payloads Swarming Demo				
Swarming Demo	4	2016	4	2016
Sea Mob Single Vehicle Autonomy at Extended Range				
Single Vehicle Autonomy at Extended Range	4	2015	4	2015
Sea Mob Simple Cooperative Behavior				
Simple Cooperative Behavior	4	2016	4	2016
Sea Mob Complex Cooperative Behavior				
Complex Cooperative Behavior	1	2018	1	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604342D8Z / *Defense Technology Offset*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	75.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
841: *Defense Technology Offset*	-	0.000	75.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

This program element is a new start in FY 2016 based on an increase in the FY 2016 Omnibus.

A. Mission Description and Budget Item Justification

Funds will be used to support the acceleration of the fielding or commercialization of offset technologies that would help counter the technological advantage of potential adversaries. Examples of offset technology areas include directed energy, low-cost high speed munitions, autonomous systems, undersea warfare, cyber technology, and intelligence data analysis. These funds will enable the Department to build and maintain the military technological superiority of the United States.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	75.000	0.000	-	0.000
Total Adjustments	0.000	75.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	75.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: 841: *Defense Technology Offset*		
Congressional Add: *Defense Technology Offset*	-	75.000
Congressional Add Subtotals for Project: 841	-	75.000
Congressional Add Totals for all Projects	-	75.000

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604342D8Z / *Defense Technology Offset*	Project (Number/Name) 841 / *Defense Technology Offset*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
841: *Defense Technology Offset*	-	0.000	75.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program element is a new start in FY 2016 based on an increase in the FY 2016 Omnibus.

A. Mission Description and Budget Item Justification

Funds will be used to support the acceleration of the fielding or commercialization of offset technologies that would help counter the technological advantage of potential adversaries. Examples of offset technology areas include directed energy, low-cost high speed munitions, autonomous systems, undersea warfare, cyber technology, and intelligence data analysis. These funds will enable the Department to build and maintain the military technological superiority of the United States.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016
Congressional Add: Defense Technology Offset	-	75.000
FY 2016 Plans: Funds will be used to support the acceleration of the fielding or commercialization of offset technologies that would help counter the technological advantage of potential adversaries. Examples of offset technology areas include directed energy, low-cost high speed munitions, autonomous systems, undersea warfare, cyber technology, and intelligence data analysis. These funds will enable the Department to build and maintain the military technological superiority of the United States.		
Congressional Adds Subtotals	-	75.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604342D8Z / *Defense Technology Offset*	**Project (Number/Name)** 841 / *Defense Technology Offset*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Enhancement, Prototyping, Development Support, and Other Activities	TBD	TBD : TBD	-	-		75.000		-		-		-	-	-	-
		Subtotal	-	-		75.000		-		-		-	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		75.000		-		-		-	-	-	-

Remarks

Consistent with the FY 2016 Omnibus, the Department needs to develop a process and criteria for the application of funding by the Components. Project costs and work schedules will be included in this implementation plan.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604342D8Z / *Defense Technology Offset*	**Project (Number/Name)** 841 / *Defense Technology Offset*

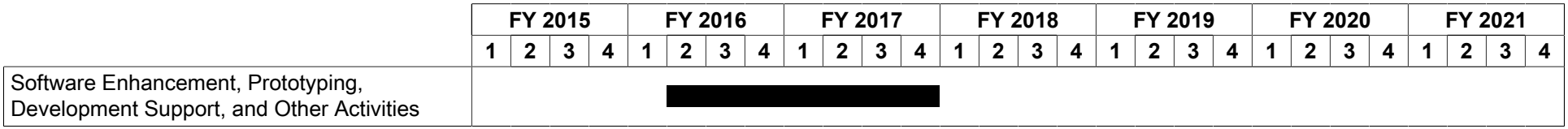

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604342D8Z / *Defense Technology Offset*	**Project (Number/Name)** 841 / *Defense Technology Offset*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Software Enhancement, Prototyping, Development Support, and Other Activities	2	2016	4	2017

Note

Consistent with the FY 2016 Omnibus, the Department needs to develop a process and criteria for the application of funding by the Components. Project costs and work schedules will be included in this implementation plan.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	43.371	7.574	7.786	3.320	-	3.320	3.998	3.842	3.869	3.944	Continuing	Continuing
P440: *UAS Airspace Integration*	24.613	4.415	0.680	0.990	-	0.990	1.000	1.000	1.000	1.000	Continuing	Continuing
P442: *Interoperability*	17.867	2.967	6.906	1.980	-	1.980	2.648	2.492	2.519	2.594	Continuing	Continuing
P443: *Unmanned Systems Roadmap*	0.891	0.192	0.200	0.350	-	0.350	0.350	0.350	0.350	0.350	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) Unmanned Systems (UxS) Common Development program is a joint effort to develop and demonstrate common standards, architectures, and technologies that address unmanned systems' issues across all Military Services. The intent is to increase interoperability and effectiveness by promoting cooperative development of solutions that are applicable across all unmanned systems. This effort initially focused on addressing DoD unmanned aircraft system (UAS) integration into the National Airspace System (NAS) and a demonstration of a common, interoperable ground station architecture and associated interface standards. While UAS initially were the primary focus, interoperability among all unmanned and manned systems is the long-term goal.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	7.791	3.129	3.486	-	3.486
Current President's Budget	7.574	7.786	3.320	-	3.320
Total Adjustments	-0.217	4.657	-0.166	-	-0.166
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.662			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-0.214	-			
• Efficiency Reductions	-	-	-0.064	-	-0.064
• FY16 FFRDC	-	-0.005	-	-	-
• Economic Assumptions	-	-	-0.027	-	-0.027
• Leadership Realignment	-	-	-0.063	-	-0.063
• Fiscal Guidance Adjustment	-	-	-0.012	-	-0.012

Change Summary Explanation

The FY2017 funding request was reduced by $ 0.063 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P440: *UAS Airspace Integration*	24.613	4.415	0.680	0.990	-	0.990	1.000	1.000	1.000	1.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013.

A. Mission Description and Budget Item Justification

Global Hawk and Triton, as well as other Group 3-5 UAS, need a sense-and-avoid (SAA) capability as an alternate means of compliance to Title 14 Code of Federal Regulations, Part 91.111 and Part 91.113, requirement to see-and-avoid other aircraft. The Air Force is leading the effort to develop an ABSAA system that is suitable to support operations within US and foreign national airspace. The RQ-4 Global Hawk, MQ-4C Triton, MQ-1B Predator, MQ-1C Gray Eagle, and MQ-9 Reaper all have a requirement for SAA capability and will leverage the technology being developed by the Air Force. The Army is leading the development of a GBSAA system to provide a solution for improved airspace access in terminal operations as well as operations/training within the GBSAA system's coverage area (e.g., Gray Eagle at Fort Hood, Shadow operations at Cherry Point). This system will provide a near-term solution and is an integral part of the long-term permanent solution.

This joint funding also supports development of common operating concepts, policy, standards, modeling and simulation, and technology to enable DoD UAS to routinely access the national and international airspace systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Unmanned Aircraft System Airspace Integration Initiatives	4.415	0.680	0.990
Description: Starting in FY 2010 the Department's sense-and-avoid (SAA) developmental efforts are enhanced by this defense-wide program element. This program has provided joint funding to accelerate the development of SAA technology and standards to enable UAS to routinely access the national and international airspace systems. This program also supports development of UAS airspace integration policy and standards, as well as the modeling, simulation, and operational analysis needed to validate the standards. In FY 2013 ABSAA and GBSAA efforts transitioned to the Services.			
FY 2015 Accomplishments: Published MIL-HDBK-516C that includes the airworthiness criteria, standards, and methods of compliance for both fixed and rotary wing UAS and SAA integrated in these aircraft systems. Continued to define airworthiness requirements for small UAS (Groups 1-3). Completed analysis of UAS airspace integration (AI) safety case development issues in order to facilitate expanded UAS access to the National Airspace System (NAS). Conducted analysis to address high priority safety gaps as identified by the SAA Science and Research Panel (SARP). The SARP has been working on recommendation for a quantitative means of compliance with sUAS Well Clear vs. manned aircraft and a BVLOS level of safety. The SARP hosted an open industry day and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
SARP workshops focused on closing these research gaps. Additionally, the SARP provided recommendations on quantifying elements of pilot situation awareness to address two high priority gaps. Tracked DoD SAA research gaps and coordinated research activities across DoD, NASA, FAA, and DHS. Coordinated system requirements and safety guidelines within appropriate standards development organizations. Collected UAS basing information, which can be used to conduct operational analysis and assist DoD in overcoming UAS AI challenges. Supported Joint Test program as they developed standardized UAS procedures for flight in US airspace. Compiled annual UAS safety data in accordance with 2011 DoD-FAA Memorandum of Agreement (MOA). Updated pilot training program in cooperation with Aircraft Owners and Pilots Association. Engaged government and industry stakeholders to identify low size, weight, power, and cost detect-and-avoid innovations that support broad-spectrum low-altitude military UAS operations. Started GBSAA installation at Beale AFB, CA. Identified, evaluated and published recommended best practices for quantifying the contribution of the UAS pilot performance of the SAA function to overall airspace safety. Funding includes a FY 2015 Congressional Add of $4.089 million.			
FY 2016 Plans: Complete updates to and implement DoD/FAA MOA. Implement findings from the Joint Test of UAS operation in US airspace. Complete small UAS Groups 1-3 airworthiness requirements study and provide a document that identifies gaps and recommends courses of action. Complete survey and analysis of UAS CONUS operating locations and airspace requirements. Continue analysis of UAS AI Safety Case issues to expand UAS access to the NAS. Develop and validate separation minima that enable low-altitude military UA to remain well clear of other aircraft. Identify and address key capability gaps for broad-spectrum military UAS operations at low altitudes. Through the SARP, coordinate with and leverage the resources of the FAA, NASA and DHS to work common integration challenges. Investigate and identify best-candidate solutions for low size, weight, power and cost approaches supporting military small UAS (sUAS) operations in national, international and foreign national airspace. Finalize and report recommended criteria and methods to quantify the contribution of the UAS pilot performance of the SAA function to overall airspace safety. Engage with FAA to discuss concepts, architectures, functional requirements as well as policy and procedural issues regarding UAS Spectrum, Communications, Command and Control and other infrastructure that will need to be enhanced, improved or replaced in order to facilitate DoD UAS integration into the NAS. Collaborate to develop and implement operating systems in the NAS that support UAS integration, such as GBSAA. Identify specific use cases of current operations and identify the gaps/deltas between current UAS operations in the NAS under a Certificate of Waiver or Authorization (COA) and UAS operating as fully integrated into the NAS. Identify specific scenarios for research, implementation, and testing. Identify operational use cases for research, development, and testing, and provide semantic decision support, and modeling and simulation.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Evaluate and validate identified best-candidate solutions for low size, weight, power and cost technology supporting military sUAS operations in national, international and foreign national airspace. Develop and finalize quantitative safety assessment approaches that support unique UAS operations to support emerging DoD needs and inform future rulemaking. Make formal recommendations for separation minima that enable low-altitude military UAS to remain well clear of other aircraft. Continue to engage the FAA to advance DoD UAS airspace integration. Finalize implementation of the UAS Airspace Integration Joint Test into Service regulations and training.			
Accomplishments/Planned Programs Subtotals	4.415	0.680	0.990

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Airworthiness	Various	AED/AFMLCC/ NAVAIR : AL/OH/MD	0.366	0.000		0.000		0.000		-		0.000	0	0.366	-
		Subtotal	0.366	0.000		0.000		0.000		-		0.000	0.000	0.366	-

Remarks

Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013.
The majority of the "Prior Year" Funding was for ABSAA and GBSAA. For purposes of this R-3, all prior year funding has been included in the UAS Task Force category.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UAS Task Force	MIPR	Various : Various	24.247	0.000		0.000		-		-		-	-	-	-
Congressional Add	Various	Various : Various	0.000	4.100		0.000		-		-		-	0	4.100	-
DoD Policy Board on Federal Aviation Support	Sub Allot	Various : Various	0.000	0.315		0.680		0.990		-		0.990	Continuing	Continuing	-
		Subtotal	24.247	4.415		0.680		0.990		-		0.990	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	24.613	4.415		0.680		0.990		-		0.990	-	-	-

Remarks

Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013. This joint funding also supports development of common operating concepts, policy, standards, modeling and simulation, and technology to enable DoD UAS to routinely access the national and international airspace systems.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*

ABSAA and GBSAA

Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013. The FY2014 President's Budget transferred $83.169M (FYDP) to the Services' UAS program PEs for this purpose.

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P440 / *UAS Airspace Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SARP				
BVLOS Level of Safety	3	2015	4	2016
SUAS Groups 1-3 Airworthiness	4	2014	4	2016
Identify gaps for broad-spectreum military UAS operations at low altitudes	2	2016	3	2016
FY 2015 Congressional Add				
Beale AFB GBSAA	4	2015	2	2017
Grand Forks AFB GBSAA	1	2016	2	2017
PBFA				
UAS AI Support	1	2016	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	Project (Number/Name) P442 / *Interoperability*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P442: *Interoperability*	17.867	2.967	6.906	1.980	-	1.980	2.648	2.492	2.519	2.594	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Interoperability project will develop and demonstrate an interoperable, standards-based, open ground station architecture for cross-domain (air, ground, maritime) unmanned systems. The intent is to improve joint and coalition interoperability and to promote competition through the implementation of open standards and open architectures.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Interoperability	2.967	6.906	1.980

Description: Develop and demonstrate an interoperable, standards-based, open ground station architecture for cross-domain (air, ground, maritime) unmanned systems; improve joint and coalition interoperability; and promote competition through the implementation of open standards and open architectures.

FY 2015 Accomplishments:

Released UCS V3.4. Completed Phase II alignment with JCUA, USIPs, and FACE. Assessed National Information Exchange Model (NIEM) for adoption. Completed UCS Repository Technical Governance documentation which will provide Unmanned Systems Programs of Record (PoRs), their Prime System Integrator (PSI) contractors, and industry the aim, content, and functionality of the Repository; and to include sections on its business acumen, mandated product description, and UCS conformance regimen. Continued to support UCS PoR migration, to include a UMS maritime demonstration test in a lab environment. The same may apply to an Unmanned Ground Robotics device in cooperation with the Joint Ground Robotics Enterprise (JGRE) and Joint Robotic and Autonomous Systems Team (JRAST). Completed JGRE studies on Communication Waveform Analysis; Military Standard/Interoperability Profile Transition to Industry Standards; and Common Control Architecture. Initiated UCS Open Business Model (OBM) revision to include all unmanned system domains (air, ground, maritime).

FY 2016 Plans:

Support, prepare, and conduct live unmanned system operational tests and demonstrations. Continue cross-domain (air, ground, maritime) harmonization efforts in coordination with the JRAST.

FY 2017 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P442 / *Interoperability*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Support, prepare, and conduct live unmanned system operational tests and demonstrations. Continue cross-domain (air, ground, maritime) harmonization efforts in coordination with the JRAST.			
Accomplishments/Planned Programs Subtotals	2.967	6.906	1.980

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

n/a

E. Performance Metrics

n/a

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P442 / *Interoperability*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UCS Architecture	MIPR	Various : Various	15.252	0.000		0.000		0.000		-		0.000	0	15.252	-
JGRE	Various	Various : Various	0.900	1.781		6.082		1.130		-		1.130	Continuing	Continuing	-
		Subtotal	16.152	1.781		6.082		1.130		-		1.130	-	-	-

Remarks

Prior Year cost are shown under UCS Architecture the primary product for P442.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Interoperability Working Groups & Studies	Various	Various : Various	1.124	0.125		-		0.000		-		0.000	Continuing	Continuing	-
UAS Task Force/ UxS SMEs	MIPR	Various : VA	0.486	0.866		0.824		0.850		-		0.850	Continuing	Continuing	-
Weapons Integration	MIPR	NAWC-WD : China Lake, CA	0.105	0.195		0.000		0.000		-		0.000	0	0.300	-
		Subtotal	1.715	1.186		0.824		0.850		-		0.850	-	-	-

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.867	2.967		6.906		1.980		-		1.980	-	-	-

Remarks

Interoperability efforts are focused on developing and demonstrating interoperable, standards-based, open ground station architecture for UAS and other unmanned systems; improving joint and coalition interoperability; and promoting competition through the implementation of open standards and open architectures.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P442 / *Interoperability*

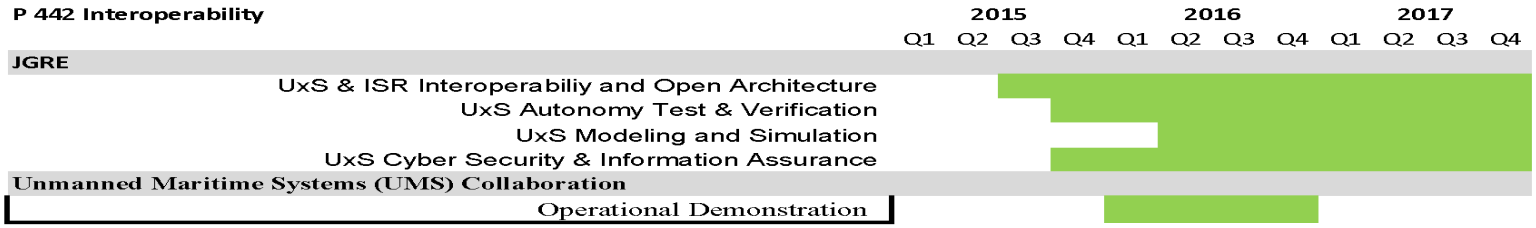

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P442 / *Interoperability*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JGRE				
UxS & ISR Interoperabiliy and Open Architecture	2	2015	4	2017
UxS Autonomy Test & Verification	4	2015	4	2017
UxS Modeling and Simulation	2	2016	4	2017
Unmanned Maritime Systems (UMS) Collaboration				
Operational Demonstration	1	2016	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P443 / *Unmanned Systems Roadmap*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P443: *Unmanned Systems Roadmap*	0.891	0.192	0.200	0.350	-	0.350	0.350	0.350	0.350	0.350	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort supports the Department's Unmanned Systems Integrated Roadmap and updates. The roadmap provides a DoD vision for the continuing development, fielding and employment of unmanned systems technologies; establishes the current state of unmanned systems in today's force; and outlines a strategy to address common challenges to achieve the shared vision across all unmanned domains (air, ground, and maritime).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Unmanned Systems Roadmap	0.192	0.200	0.350
Description: Develops and updates the Department's Unmanned Systems Integrated Roadmap. ***FY 2015 Accomplishments:*** Initiated the update of the Department's Unmanned Systems Integrated Roadmap and performed related studies supporting the Department's vision for unmanned systems. Maintained the on-line unmanned system catalogue for DoD use. ***FY 2016 Plans:*** Update and publish the Department's "Unmanned Systems Integrated Roadmap, 2016-2041" and perform related studies supporting the Department's vision for unmanned systems. ***FY 2017 Plans:*** Update the Department's Unmanned Systems Integrated Roadmap and perform related studies supporting the Department's vision for unmanned systems.			
Accomplishments/Planned Programs Subtotals	0.192	0.200	0.350

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P443 / *Unmanned Systems Roadmap*

E. Performance Metrics

Provide up-to-date Unmanned Systems Roadmap providing a DoD vision for the continuing development, fielding and employment of unmanned systems technologies.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P443 / *Unmanned Systems Roadmap*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Unmanned Systems Roadmap	Various	Various : Various	0.891	0.192		0.200		0.350		-		0.350	Continuing	Continuing	-
		Subtotal	0.891	0.192		0.200		0.350		-		0.350	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.891	0.192		0.200		0.350		-		0.350	-	-	-

Remarks

This effort supports the Department's Unmanned Systems Integrated Roadmap and updates. The roadmap is publshed every two years, with the most recent edition released in FY 2014.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P443 / *Unmanned Systems Roadmap*

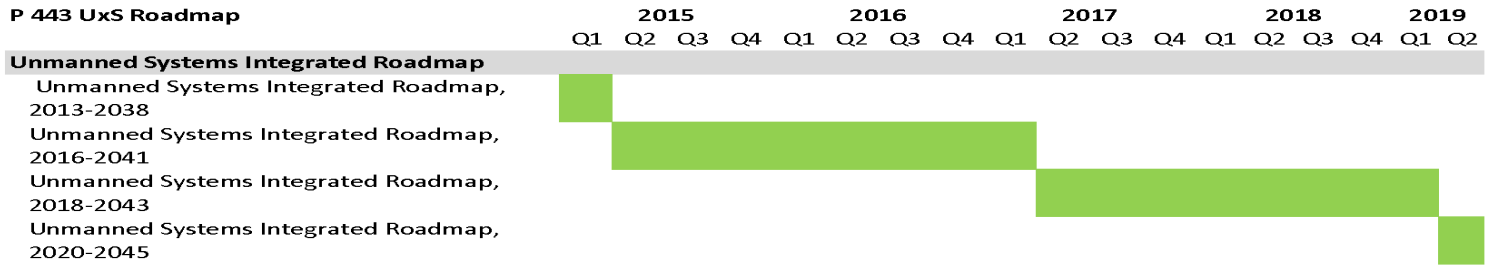

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604400D8Z / *Department of Defense (DoD) Unmanned Systems Common Development*	**Project (Number/Name)** P443 / *Unmanned Systems Roadmap*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Unmanned Systems Integrated Roadmap				
2016-2041 Edition	2	2015	1	2017
2018-2043 Edition	1	2017	1	2019
2020-2045 Edition	1	2019	1	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	4.000	-	4.000	4.000	4.000	4.000	4.000	Continuing	Continuing
104: *Wargaming & Support for Strategic Analysis*	0.000	0.000	0.000	4.000	-	4.000	4.000	4.000	4.000	4.000	Continuing	Continuing

Note

This is a New Start Program in FY 2017.

A. Mission Description and Budget Item Justification

A. Mission Description and Budget Item Justification

This is a new start. This program supports the Office of the Director, Cost Assessment & Program Evaluation (CAPE). It funds activities that help CAPE to implement the vision of the Deputy Secretary of Defense to reinvigorate wargaming in the Department of Defense. CAPE will accomplish this by leading wargaming activities; developing and managing the Wargaming Portal, and supporting the design, execution, and analysis of wargames.

This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Deputy Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance the senior leadership's deliberations and decision-making.

This program provides the scientific and technical engineering services needed for research studies in the development of models and simulations and the evaluation of current analytical tools and scientific methods used to evaluate and assess scenarios and concepts of operations (CONOPS) for a wide range of warfighting environments and scenarios. Deliverables from this program will include reports, briefings, and analyses designed to illuminate findings and assessments from wargaming excursions. Outcomes include the compilation and analysis of wargaming data in the Wargaming Portal and support for data use by wargaming participants.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604682D8Z *I Wargaming & Support for Strategic Analysis (SSA)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	4.000	-	4.000
Total Adjustments	0.000	0.000	4.000	-	4.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Wargaming Reinvigoration Add	0.000	0.000	4.000	-	4.000

Change Summary Explanation

New Start. Program added to reinvigorate Wargaming and Support for Strategic Analysis to support Deputy Secretary of Defense priority.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*	Project (Number/Name) 104 / *Wargaming & Support for Strategic Analysis*	

COST ($ in Millions)	Prior Years (+)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
104: *Wargaming & Support for Strategic Analysis*	0.000	0.000	0.000	4.000	-	4.000	4.000	4.000	4.000	4.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

(+) The sum of all Prior Years is $0.000 million less than the represented total due to several projects ending

A. Mission Description and Budget Item Justification

A. Mission Description and Budget Item Justification

This program supports the Office of the Director, Cost Assessment & Program Evaluation (CAPE). It funds activities that help CAPE to implement the vision of the Deputy Secretary of Defense to reinvigorate wargaming in the Department of Defense. CAPE will accomplish this by leading wargaming activities; developing and managing the Wargaming Portal, and supporting the design, execution, and analysis of wargames.

This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Deputy Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance the senior leadership's deliberations and decision-making.

This program provides the scientific and technical engineering services needed for research studies in the development of models and simulations and the evaluation of current analytical tools and scientific methods used to evaluate and assess scenarios and concepts of operations (CONOPS) for a wide range of warfighting environments and scenarios. Deliverables from this program will include reports, briefings, and analyses designed to illuminate findings and assessments from wargaming excursions. Outcomes include the compilation and analysis of wargaming data in the Wargaming Portal and support for data use by wargaming participants.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Wargaming & Support for Strategic Analysis	0.000	0.000	4.000
Description: This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Deputy Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance the senior leadership's deliberations and decision-making.			
FY 2015 Accomplishments: New Start in FY 2017			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*	**Project (Number/Name)** 104 / *Wargaming & Support for Strategic Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
New Start in FY 2017 ***FY 2017 Plans:*** Studies, analyses, and assessments will be focused on: - Developing wargaming objectives from senior leader priorities and Strategic Support Analysis activities. - Overseeing planning, design, and scheduling of excursion wargames - Leading, participating in, and assessing outcomes of all excursion wargames. - Participating in some near-, mid-, and far-term scenarios and CONOPS wargames. - Analyzing wargame insights and data in the Wargaming Repository. - Providing requirements for the Wargaming Portal as needed. - Providing guidance to DoD on best practices for mid-term wargames.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	4.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

A mix of competitive contracts with commercial firms and research provided by university-affiliated research centers (UARCs), and Federally Funded Research and Development Centers (FFRDCs).

E. Performance Metrics

The products or expected outcomes of this program are studies and analyses to support issues of high interest to the Deputy Secretary of Defense. Products will also include the Wargaming Repository to provide a knowledge base for the Department of Defense. Performance is measured by the quality of the analyses and is monitored through the review of the organizational assessment process. The primary goal is to ensure that study and analytical products are timely, clear, complete, accurate, responsive, balanced, and objective.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*	Project (Number/Name) 104 / *Wargaming & Support for Strategic Analysis*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Wargaming & Support for Strategic Analysis	C/Various	Various : Virginia	0.000	0.000		0.000		4.000	Dec 2016	-		4.000	-	-	-
		Subtotal	0.000	0.000		0.000		4.000		-		4.000	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		4.000		-		4.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*	**Project (Number/Name)** 104 / *Wargaming & Support for Strategic Analysis*

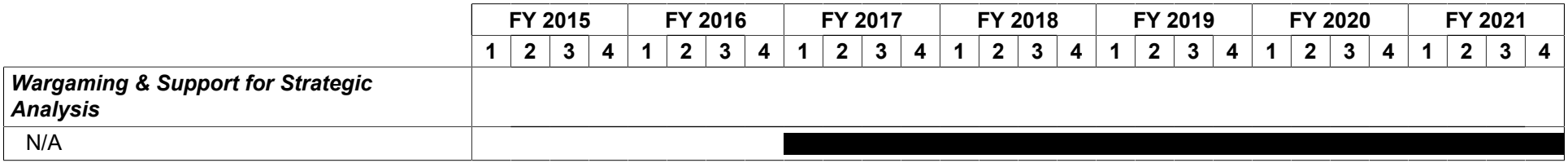

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604682D8Z / *Wargaming & Support for Strategic Analysis (SSA)*	**Project (Number/Name)** 104 / *Wargaming & Support for Strategic Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Wargaming & Support for Strategic Analysis				
N/A	1	2017	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604775D8Z / *Defense Rapid Innovation Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	593.008	224.910	250.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
P775: *Defense Rapid Innovation Program*	593.008	224.910	250.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Defense Authorization Act (NDAA) for FY2015 and the Consolidated Appropriations Act, 2015, provide the Department of Defense with authorities and funds to facilitate the rapid insertion of innovative technologies into military systems and programs. The purpose of the DoD-wide Rapid Innovation Fund (RIF) program is to perform a solicitation, evaluation and award of contracts that support the aforementioned Congressional authorities and support the DoD goals of emphasis on rapid, responsive acquisition and engagement of small, innovative businesses in solving defense challenges.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	225.000	0.000	0.000	-	0.000
Current President's Budget	224.910	250.000	0.000	-	0.000
Total Adjustments	-0.090	250.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	0.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	250.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.090	-			
• SBIR/STTR Transfer	-	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: P775: *Defense Rapid Innovation Program*		
Congressional Add: *Defense Rapid Innovation Fund*	224.910	250.000
Congressional Add Subtotals for Project: P775	224.910	250.000
Congressional Add Totals for all Projects	224.910	250.000

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604775D8Z / *Defense Rapid Innovation Program*	Project (Number/Name) P775 / *Defense Rapid Innovation Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P775: *Defense Rapid Innovation Program*	593.008	224.910	250.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The National Defense Authorization Act (NDAA) for FY2016 and the Consolidated Appropriations Act, 2016, provide the Department of Defense with authorities and funds to facilitate the rapid insertion of innovative technologies into military systems and programs. The purpose of the DoD-wide Rapid Innovation Fund (RIF) program is to perform a solicitation, evaluation and award of contracts that support the aforementioned Congressional authorities and support the DoD goals of emphasis on rapid, responsive acquisition and engagement of small, innovative businesses in solving defense challenges.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016
Congressional Add: Defense Rapid Innovation Fund	224.910	250.000
FY 2015 Accomplishments: Funds will be used for research and development in the key areas defined by the Army, Navy, Air Force and various Agencies/Programs within the Office of the Secretary of Defense. Investments are targeted to defense requirements within the budget year of execution. The defense wide focus areas for the FY2015 Rapid Innovation Fund Program include; 1) Deliver near term, emerging technologies to enhance the capabilities for current Military operations; 2) Innovative technologies that enhance position, navigation, timing accuracies, improve targeting/delivery in GPS-denied environments and prevent exploitation of systems lost in denied areas (e.g., anti-tamper capabilities); 3) Develop and demonstrate breakthrough technologies for future Military capabilities. FY2015 funds will be distributed evenly between the services (Army, Navy, Air Force) and the 4th estate agencies.		
FY 2016 Plans: Funds will be used for research and development in the key areas defined by the Army, Navy, Air Force and various Agencies/Programs within the Office of the Secretary of Defense. Investments are targeted to defense requirements within the budget year of execution. The defense wide focus areas for the FY2016 Rapid Innovation Fund Program include: 1) Deliver near term, emerging technologies to enhance the capabilities for current military operations, e.g., for soldier force protection, for anti-access / area denial operations, or for other near-term solutions that improves ongoing support to the forces; 2) Innovative technologies that enhance the affordability of defense operations, e.g., reduce the cost and footprint of fielded weapon systems, extend system life of aging platforms, or improve interoperability for portable, modular scalable and secure systems; and 3) Develop and demonstrate breakthrough technologies for future military capabilities, e.g., assured communications in space and man-made environments, improved position, navigation, sensors		

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604775D8Z / *Defense Rapid Innovation Program*	**Project (Number/Name)** P775 / *Defense Rapid Innovation Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016
and sensor processing in GPS-denied environments, or for countering unmanned air or underwater systems. FY 2016 funds will be distributed using a merit-based competitive process that considers the highest priority funding candidates across the military services (Army, Navy, Air Force), the 4th estate agencies, and key Combatant Commands. Preferences will be given to funding small business proposals through a competitive broad agency announcement process.		
Congressional Adds Subtotals	224.910	250.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Each RIF project is evaluated at its conclusion based on two measures: 1) technical performance, or extent the RIF project is meeting its technical goals, with an assessment of cost, schedule, and deliverables against stated objectives; and 2) transition status, or the extent to which an acquisition program or customer has been identified and is participating in procuring the technology, assuming the RIF project is successful.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604775D8Z / *Defense Rapid Innovation Program*	**Project (Number/Name)** P775 / *Defense Rapid Innovation Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	499.723	131.625		146.309		-		-		-	0	777.657	-
		Subtotal	499.723	131.625		146.309		-		-		-	0.000	777.657	-

Remarks

The defense wide focus areas for the FY2016 Rapid Innovation Fund Program include: 1) Deliver near-term, emerging technologies to enhance the capabilities for current military operations; 2) Innovative technologies that enhance position, navigation, timing accuracies, improve targeting/delivery in GPS-denied environments and prevent exploitation of systems lost in denied areas (e.g., anti-tamper capabilities); 3) Develop and demonstrate breakthrough technologies for future military capabilities. FY2016 funds will be distributed evenly between the Services (Army, Navy, Air Force) and the fourth estate agencies.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	86.625	86.625		96.288		-		-		-	0.00	269.538	-
		Subtotal	86.625	86.625		96.288		-		-		-	0.000	269.538	-

Remarks

Provided, That of the funds made available in this paragraph, $250,000,000 for the Defense Rapid Innovation Program shall only be available for expenses, not otherwise provided for, to include program management and oversight, to conduct research, development, test and evaluation to include proof of concept demonstration; engineering, testing, and validation; and transition to full-scale production

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	6.660	6.660		7.403		-		-		-	0	20.723	-
		Subtotal	6.660	6.660		7.403		-		-		-	0.000	20.723	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604775D8Z / *Defense Rapid Innovation Program*	Project (Number/Name) P775 / *Defense Rapid Innovation Program*	

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	593.008	224.910		250.000		-		-		-	0.000	1,067.918	-

Remarks

The defense wide focus areas for the FY2016 Rapid Innovation Fund Program include: 1) Deliver near-term, emerging technologies to enhance the capabilities for current military operations; 2) Innovative technologies that enhance position, navigation, timing accuracies, improve targeting/delivery in GPS-denied environments and prevent exploitation of systems lost in denied areas (e.g., anti-tamper capabilities); 3) Develop and demonstrate breakthrough technologies for future military capabilities. FY2016 funds will be distributed evenly between the Services (Army, Navy, Air Force) and the fourth estate agencies.

Established in Section 1073 of the FY 2011 National Defense Authorization Act (NDAA), the Rapid Innovation Program is a competitive, merit-based program designed to accelerate the fielding of innovative technologies into military systems pursuant to Small Business Innovative Research (SBIR) phase II projects, Technologies developed by the Department of Defense (DoD) laboratories and Other innovative technologies, including dual-use & Independent Research & Development (IRAD) technologies. The NDAA for FY2016 and the Consolidated Appropriations Act, 2016, extends RIP authorities to September 2023 and provides the Department of Defense.

There is a two-step competitive process for participation in the program. Industry is invited to submit white papers that meet the congressional and DoD criteria. Once those white papers have been reviewed the highest ranking white papers are selected and invited to submit full proposals for consideration (there is no guarantee of an award). Those full proposal go through a review and again the highest ranking full proposals are selected for negotiation and ultimately award.

Currently the review of the highest ranking proposals to receive FY15 funding have recently concluded (1 FEB 2016). FY16 funds and projects have not yet begun. The FY15 schedule is as follows:

1 March 2015 Requirements from Components, prep DRAFT BAA
15 April 2015 BAA Release in FEDBIZOPPs (link to be provided)
15 June 2015 BAA Closes: White Papers (WPs) due from offerors
15 October 2015 Components complete WP evaluations Initial priorities and ranking by Components
2 November 2015 Components notify all offerors of WP disposition, invite full proposals
1 December 2015 Full proposals due from offerors Components start full proposal evaluations
1 February 2016 Components complete full proposal evaluations
1 March 2016 Negotiations complete, contract awards
1 June 2016 FY15 funded RIF contract awards complete

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604775D8Z / *Defense Rapid Innovation Program*	**Project (Number/Name)** P775 / *Defense Rapid Innovation Program*

Rapid Innovation Fund (RIF) Program
(Milestones: 2016 Funding Execution)

Date	Action
1-15 February 2016	Requirements from defense components, publish implementation guidelines, acquisition plan approved, prepare draft Broad Agency Announcement (BAA)
1 March 2016	BAA released in Federal Business Opportunities (FEDBIZOPPs)
1 May 2016	BAA closes, White Papers (WPs) due from offerors
1 September 2016	Components complete WP evaluations, source selection officials priorities established with WP ranking by components
1 October 2016	WP notifications to all vendors, invitation or requests for full proposals
1 November 2016	Full proposals due from offerors, components start full proposal evaluations
1 January 2017	Components complete full proposal evaluations
1 February 2017	Components initiate contract negotiations and begin contract awards
1 May 2017	FY16-funded RIF contract awards complete

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604775D8Z / *Defense Rapid Innovation Program*	**Project (Number/Name)** P775 / *Defense Rapid Innovation Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Army, Navy, Air Force, Fourth Estate	2	2016	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	12.477	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
001: *Maritime Capability*	0.000	12.477	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 0000

A. Mission Description and Budget Item Justification

This program element supports studies in the areas of networks, information integration, defense-wide command and control (C2), and communications. This program is funded under Budget Activity 4, Demonstration and Validation.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	12.482	0.000	0.000	-	0.000
Current President's Budget	12.477	0.000	0.000	-	0.000
Total Adjustments	-0.005	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.005	-			
• SBIR/STTR Transfer	-	-			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0605170D8Z / *Support to Networks and Information Integration*	Project (Number/Name) 001 / *Maritime Capability*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
001: *Maritime Capability*	0.000	12.477	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 0000

A. Mission Description and Budget Item Justification

This program element supports studies in the areas of networks, information integration, defense-wide command and control (C2), and communications. This program is funded under Budget Activity 4, Demonstration and Validation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Maritime Capabilities Accomplishments and Plans	12.477	0.000	0.000
FY 2015 Accomplishments: Maritime Capabilities. Classified Program details provided at a higher classification under separate cover. This is one piece of the total Department increase for Maritime Capabilities. Other associated funding can be found under PE 0605170D8Z, BA6 22.5 million, and PE 0305199D8Z, BA 7, 5 million.			
FY 2016 Plans: N/A			
FY 2017 Plans: N/A			
Accomplishments/Planned Programs Subtotals	12.477	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Classified Program details provided at a higher classification under separate cover.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0605170D8Z / *Support to Networks and Information Integration*	Project (Number/Name) 001 / *Maritime Capability*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Engineering Services	Various	Various : Various	-	12.477	Jul 2015	-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	-	12.477		-		-		-		-	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	12.477		0.000		-		-		-	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 001 / *Maritime Capability*

R4

PE: 0605170D8Z/ Support to NII

Funding supports Maritime Capabilities

	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020	10/1/2021
FY2014 Program Execution								
FY2015 Program Execution								
FY2016 Program Execution								
FY2017 Program Execution								
FY2018 Program Execution								
FY2019 Program Execution								
FY2020 Program Execution								

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 001 / *Maritime Capability*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 Project Execution	1	2015	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0303191D8Z / *Joint Electromagnetic Technology (JET) Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	3.150	2.650	2.656	2.636	-	2.636	2.849	3.025	3.064	3.124	Continuing	Continuing
192: *Joint Electromagnetic Technology (JET) Program*	3.150	2.650	2.656	2.636	-	2.636	2.849	3.025	3.064	3.124	Continuing	Continuing

A. Mission Description and Budget Item Justification

The JET Program supports the Defense Community in general with a particular emphasis on the communication requirements of Special Forces and Intelligence. Details of the program are classified. This program is funded under Budget Activity 4, Demonstration and Validation.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	2.651	2.660	2.716	-	2.716
Current President's Budget	2.650	2.656	2.636	-	2.636
Total Adjustments	-0.001	-0.004	-0.080	-	-0.080
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustment	-0.001	-	-0.009	-	-0.009
• FFRDC Reduction	-	-0.004	-	-	-
• Efficiency Reduction	-	-	-0.054	-	-0.054
• Economic Assumption	-	-	-0.017	-	-0.017

Change Summary Explanation

FY 2015: Program Adjustment -0.001 million.

FY 2016: FFRDC Reduction -0.004 million.

FY2017: Efficiency Reduction -0.054 million, Economic Assumption -0.017 million, Program Adjustment -0.009 million.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0303191D8Z / *Joint Electromagnetic Technology (JET) Program*	**Project (Number/Name)** 192 / *Joint Electromagnetic Technology (JET) Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
192: *Joint Electromagnetic Technology (JET) Program*	3.150	2.650	2.656	2.636	-	2.636	2.849	3.025	3.064	3.124	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The JET Program supports the Defense Community in general with a particular emphasis on the communication requirements of Special Forces and Intelligence. Details of the program are classified. This program is funded under Budget Activity 4, Demonstration and Validation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: JET Program Initiatives	2.650	2.656	2.636
FY 2015 Accomplishments: Program Planning and Support			
FY 2016 Plans: Program Planning and Support			
FY 2017 Plans: Program Planning and Support			
Accomplishments/Planned Programs Subtotals	2.650	2.656	2.636

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Numbers of operational field demonstrations.
- Numbers of false-positive results.
- Successful technology transfer to service component.
- Number of service requirements satisfied.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0303191D8Z / *Joint Electromagnetic Technology (JET) Program*	**Project (Number/Name)** 192 / *Joint Electromagnetic Technology (JET) Program*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering	Various	Various : Various	3.150	2.650	Jul 2015	2.656	Jul 2016	2.636	Jul 2017	-		2.636	Continuing	Continuing	Continuing
		Subtotal	3.150	2.650		2.656		2.636		-		2.636	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.150	2.650		2.656		2.636		-		2.636	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0303191D8Z / *Joint Electromagnetic Technology (JET) Program*	**Project (Number/Name)** 192 / *Joint Electromagnetic Technology (JET) Program*

R4

PE: 0303191D8Z/ Joint Electromagnetic Technology

Funding supports the development of Joint Electromagnetic Technologies (JET) that support DoD Special communications and communications assurance.

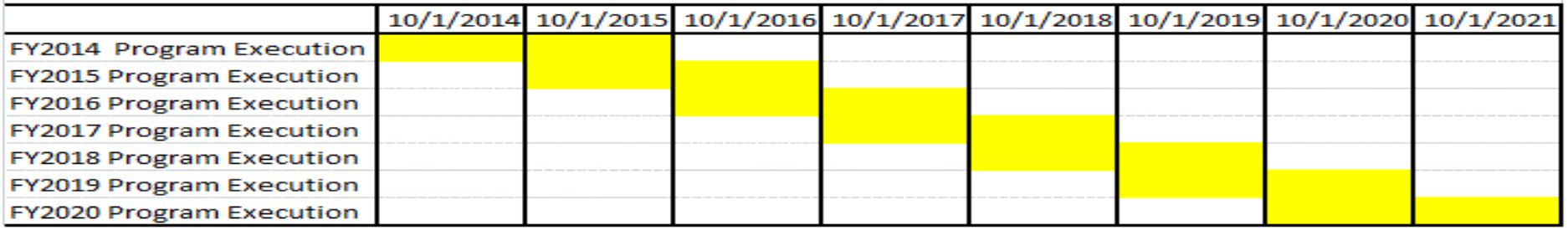

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0303191D8Z / *Joint Electromagnetic Technology (JET) Program*	**Project (Number/Name)** 192 / *Joint Electromagnetic Technology (JET) Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 Project Execution	1	2015	4	2016
FY16 Project Execution	1	2016	4	2017
FY17 Project Execution	1	2017	4	2018
FY18 Project Execution	1	2018	4	2019
FY19 Project Execution	1	2019	4	2020
FY20 Project Execution	1	2020	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	34.663	7.775	8.783	10.324	-	10.324	11.276	12.747	12.816	15.034	Continuing	Continuing
P163: *Nuclear and Conventional Physical Security*	33.647	3.872	5.118	6.903	-	6.903	7.959	6.943	7.083	7.221	Continuing	Continuing
P042: *CNT Rad/Nuc Passive Defense SDD*	1.016	3.903	3.665	3.421	-	3.421	3.317	5.804	5.733	7.813	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the need to defend and deter against weapons of mass destruction (WMD) threats and to safeguard personnel; prevent unauthorized access to equipment, installations, material, and documents; and to safeguard the foregoing against espionage, sabotage, damage, and theft. This program oversees advanced engineering development throughout DoD for an integrated and systemic RDT&E approach for countering nuclear threats and nuclear and conventional physical security technology and systems. The funding has been centralized in this Defense-wide PE since the early 1990s and represents a substantial portion of all DoD physical security RDT&E funding. Priorities for this PE RDT&E efforts are driven by inputs from Quadrennial Defense Review guidance, Combatant Command and Service requirements, analysis reports such as “Protecting the Force: Lessons from Fort Hood,” January 2010, the Integrated Unit, Base, and Installation Protection Cost Benefits Analysis, Multi-national Work Plans established through the Nuclear Security Summit process, and DoD Directive 5210.41, Security Policy for Protecting Nuclear Weapons-directed requirements and associated security deviation reports.

Under this integrated approach, funds are used to provide system development and demonstration for the Department in seven capability areas: (1) Detection and Assessment; (2) Access Controls; (3) Installation and Transport Security; (4) Storage and Safeguards; (5) Prevention; (6) Decision Support Systems; and (7) Analytical Support. The program will develop systems that are producible, supportable, and affordable and to demonstrate system integration, interoperability, and utility prior to full-rate production. The projects under the PE become technology insertions into existing programs or advance to being a certified Commercial/Government off-the-shelf product. The PE initiatives are coordinated by the Physical Security Enterprise and Analysis Group. This group is responsible for avoiding duplication of effort and when applicable ensure systems integration and promote interoperability and sustainability.

This PE can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604161D8Z *I Nuclear and Conventional Physical Security/Countering Nuclear Threats*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	7.925	8.800	9.390	-	9.390
Current President's Budget	7.775	8.783	10.324	-	10.324
Total Adjustments	-0.150	-0.017	0.934	-	0.934
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-0.147	-			
• Internal realignment	-	-	1.078	-	1.078
• FFRDC	-	-0.017	-	-	-
• Fiscal Guidance Adjustment	-	-	-0.031	-	-0.031
• Economic Assumptions Adjustment	-	-	-0.080	-	-0.080
• Departmental Efficiency Adjustment	-	-	-0.033	-	-0.033

Change Summary Explanation

Internally realigned funding to this RDT&E Program Element to address additional advanced development for the Radiological Detection System

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	Project (Number/Name) P163 / *Nuclear and Conventional Physical Security*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P163: *Nuclear and Conventional Physical Security*	33.647	3.872	5.118	6.903	-	6.903	7.959	6.943	7.083	7.221	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses the need to defend and deter against weapons of mass destruction (WMD) threats and to safeguard personnel; prevent unauthorized access to equipment, installations, material, and documents; and to safeguard the foregoing against espionage, sabotage, damage, and theft. This program oversees advanced engineering development throughout DoD for an integrated and systemic RDT&E approach for countering nuclear threats and nuclear and conventional physical security technology and systems. The funding has been centralized in this Defense-wide PE since the early 1990s and represents a substantial portion of all DoD physical security RDT&E funding. Priorities for this PE RDT&E efforts are driven by inputs from Quadrennial Defense Review guidance, Combatant Command and Service requirements, analysis reports such as “Protecting the Force: Lessons from Fort Hood,” January 2010, the Integrated Unit, Base, and Installation Protection Cost Benefits Analysis, Multi-national Work Plans established through the Nuclear Security Summit process, and DoD Directive 5210.41, Security Policy for Protecting Nuclear Weapons-directed requirements and associated security deviation reports.

Under this integrated approach, funds are used to provide system development and demonstration for the Department in seven capability areas: (1) Detection and Assessment; (2) Access Controls; (3) Installation and Transport Security; (4) Storage and Safeguards; (5) Prevention; (6) Decision Support Systems; and (7) Analytical Support. The program will develop systems that are producible, supportable, and affordable and to demonstrate system integration, interoperability, and utility prior to full-rate production. The projects under the PE become technology insertions into existing programs or advance to being a certified Commercial/Government off-the-shelf product. The PE initiatives are coordinated by the Physical Security Enterprise and Analysis Group. This group is responsible for avoiding duplication of effort and when applicable ensure systems integration and promote interoperability and sustainability.

This PE can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Detection and Assessment	1.354	3.138	3.138

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: The ability to detect an adversary and assess their intentions is a basic physical security tenant. This capability area will design equipment to identify and warn of unauthorized access to a specified area or installation as well as equipment related to the notification and identification of explosive threats or hazards. ***FY 2015 Accomplishments:*** • Test & Evaluation: Comparative Evaluation of Trace Detection Systems for Use at an Entry Control • Develop Millimeter Wave Asymmetric Threat Detection • Develop Sonar Propagation Acoustics Model Transition to Operational Initial Capability • Develop Hand-Held Explosive Detection Equipment for Maritime Operations ***FY 2016 Plans:*** • Continue to develop Millimeter Wave Asymmetric Threat Detection • Continue to develop Sonar Propagation Acoustics Model Transition to Operational Initial Capability • Continue to develop Hand-Held Explosive Detection Equipment for Maritime Operations ***FY 2017 Plans:*** • Continue to develop Millimeter Wave Asymmetric Threat Detection • Continue to develop Sonar Propagation Acoustics Model Transition to Operational Initial Capability • Continue to develop Hand-Held Explosive Detection Equipment for Maritime Operations			
Title: Access Controls ***Description:*** Controlling access to safeguard personnel and their families and to prevent unauthorized access to critical infrastructure and materials is paramount. This capability area will focus on programs and processes related to the validity and verification of individuals entering or already within, a facility. ***FY 2015 Accomplishments:*** • Develop an access control capability that leverages information housed in local law enforcement databases ***FY 2016 Plans:*** • Continue to develop an access control capability that leverages information housed in local law enforcement databases ***FY 2017 Plans:*** • Continue to develop an access control capability that leverages information housed in local law enforcement databases	0.660	1.000	1.010
Title: Installation and Transport Security	0.796	-	0.550

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Robust installation and transport security are vital to preventing a weapon of mass destruction attack or the unauthorized access to key assets such as nuclear weapons and special nuclear material. This capability area will focus on programs and equipment intended to improve the physical security profile of fixed sites and facilities, as well as critical items while in-transit. ***FY 2015 Accomplishments:*** • Integrate detection options and response capabilities previously identified, to include the full spectrum of non-lethal to lethal tactical weapon systems, to protect personnel and assets against the terrorist threat in a waterside security environment. ***FY 2017 Plans:*** • Integrate detection options and response capabilities previously identified, to include the full spectrum of non-lethal to lethal tactical weapon systems, to protect personnel and assets against the terrorist threat in an in transit maritime environment.			
Title: Storage and Safeguards ***Description:*** Properly securing critical assets to prevent access by unauthorized persons and implementing control measures that ensure access is limited to authorized persons is the foundation of physical security. This capability area will focus on equipment (e.g., locks, doors, etc.) designed to delay or stop unauthorized entry / access to a specified / localized area. ***FY 2015 Accomplishments:*** • Develop RFID Tagging for Items in Extreme Cold Storage (OCONUS)	0.164	-	-
Title: Prevention ***Description:*** The security procedures taken to discourage an adversary from accessing weapons of mass destruction or gaining unauthorized access to critical assets are at the heart of prevention. This capability area will focus on broad spectrum, generic efforts which have the ability to influence multiple areas. ***FY 2017 Plans:*** • Develop capability to share and automate content across the defense security, biosurveillance, and countering weapons of mass destruction integration mission areas	-	-	0.660
Title: Decision Support Systems ***Description:*** Decision support systems serve the management, operations, and planning levels of the DoD physical security enterprise to help to make decisions, which may be rapidly changing and not easily specified in advance. This capability area will	0.569	0.980	0.880

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
focus on command and control equipment and projects related to the creation and enhancement of common operating pictures, and the establishment of common architectures / interface standards. ***FY 2015 Accomplishments:*** • Develop a Defense Security Enterprise Architecture that would link/harmonize disparate and sub-optimal capabilities utilizing existing and emerging Component capabilities to better close known physical security gaps ***FY 2016 Plans:*** • Continue to develop a Defense Security Enterprise Environment that would link/harmonize disparate and sub-optimal capabilities utilizing existing and emerging Component capabilities to better close known physical security gaps ***FY 2017 Plans:*** • Finalize the development of a Defense Security Enterprise Environment that would link/harmonize disparate and sub-optimal capabilities utilizing existing and emerging Component capabilities to better close known physical security gaps			
Title: Analytical Support ***Description:*** This capability area will focus on studies related to physical security topics and operational and management efforts related to day-to-day activities of the DoD Physical Security Enterprise RDT&E Program. ***FY 2015 Accomplishments:*** • Conduct physical security test and evaluation efforts • Provide DOD and industry the means to achieve PSE interoperability ***FY 2017 Plans:*** • Conduct physical security test and evaluation efforts • Provide DOD and industry the means to achieve PSE interoperability	0.329	-	0.665
Accomplishments/Planned Programs Subtotals	3.872	5.118	6.903

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

E. Performance Metrics

The program performance metrics are established/approved through the Office of the Deputy Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs / Nuclear Matters. The cost, schedule and technical progress of each project is reviewed at quarterly PSEAG. Performance variances are addressed and corrective action is implemented as necessary.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hand-Held Explosive Detection Equipment for Maritime Operations	MIPR	NAVEODTECH : Indian Head, MD	0.840	0.310		0.000		-		-		-	-	-	-
Sonar Propagation Acoustics Model Transition to Operational Initial Capability	MIPR	SPAWAR Pacific : San Diego, CA	0.642	0.450		0.000		-		-		-	-	-	-
RFID Tagging for Items in Extreme Cold Storage	MIPR	Army Medical Research Institute of Infectious Diseases : Ft. Detrick, MD	0.462	0.167		-		-		-		-	-	-	-
Hailing Acoustic, Laser and Light Tactical System	MIPR	NSWC, DAHLGREN DIVISION : Dahlgren, VA	1.982	-		-		-		-		-	-	-	-
Joint Detection & Assessment	TBD	TBD : TBD	-	-		2.283		-		-		-	-	-	-
Radar Processing Dynamic Filter	MIPR	SPAWAR Pacific : San Diego, CA	0.587	-		-		-		-		-	-	-	-
Joint Explosive Detection Equipment	TBD	TBD : TBD	-	-		1.181		1.083		-		1.083	-	-	-
Physical Security Enterprise RDT&E	Various	Various : Various	23.280	-		-		0.615		-		0.615	-	-	-
Radiological Detection System	MIPR	JPM-RND : Aberdeen, MD	-	-		-		2.835		-		2.835	-	-	-
		Subtotal	27.793	0.927		3.464		4.533		-		4.533	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Nuclear Matters Contract Support	MIPR	Washington Headquarters	-	0.575		-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Services : Arlington, VA													
Applied Research Laboratories: University of Texas	MIPR	Naval Sea Systems Command : Washington Navy Yard, DC	0.328	-		-		0.225		-		0.225	-	-	-
		Subtotal	0.328	0.575		-		0.225		-		0.225	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Millimeter Wave Asymmetric Threat Detection	MIPR	NAVEODTECH : Indian Head, MD	-	0.220		1.344		-		-		-	-	-	-
Comparative Evaluation of Trace Detection Systems for Use at an Entry Control	MIPR	NAVEODTECH : Indian Head, MD	-	0.869		-		0.700		-		0.700	-	-	-
Smith Detection's HazMatID Elite and HazMatID 360	MIPR	NAVEODTECH : Indian Head, MD	0.801	-		-		-		-		-	-	-	-
Trace Detection and Identification of Explosives using Thin Layer Chromatography	MIPR	NAVEODTECH : Indian Head, MD	-	-		-		0.250		-		0.250	-	-	-
Detection of Desensitized Homemade Explosives	MIPR	NAVEODTECH : Indian Head, MD	-	-		-		0.150		-		0.150	-	-	-
Detection and Assessment T&E	MIPR	SPAWAR Atlantic : Charleston, SC	-	-		-		0.621		-		0.621	-	-	-
		Subtotal	0.801	1.089		1.344		1.721		-		1.721	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Security Equipment Integration Working Group	MIPR	SPAWAR Atlantic : Charleston, SC	3.094	0.750		-		-		-		-	-	-	-
ePSEAG (program management tool) / PSEAG Website	MIPR	AF Civil Engineering Center : Panama City, FL	1.022	0.531		0.310		-		-		-	-	-	-
JASON Study	MIPR	Washington Headquarters Services : Arlington, VA	0.609	-		-		0.424		-		0.424	-	-	-
		Subtotal	4.725	1.281		0.310		0.424		-		0.424	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	33.647	3.872		5.118		6.903		-		6.903	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

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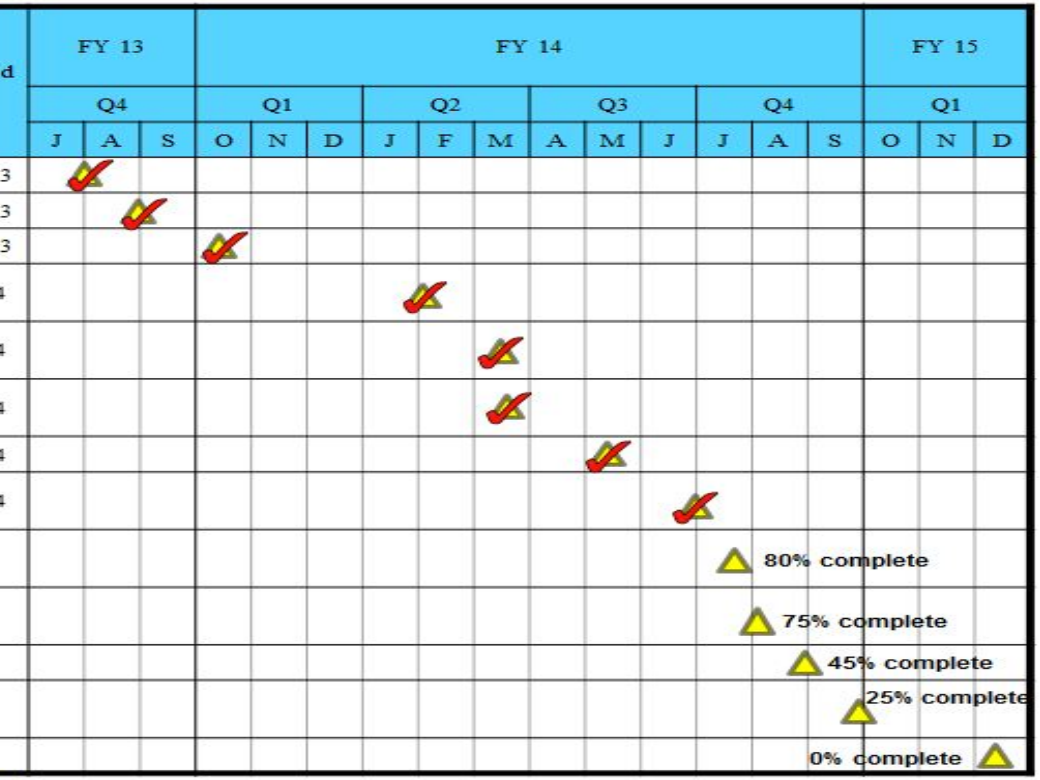
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

HALLTS Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kickoff Meeting with Sponsor	8/1/2013	07/31/2013	07/31/2013
Draft PSPEC Developed	8/29/2013	08/29/2013	08/29/2013
PSPEC Finalized	10/14/2013	10/14/2013	10/14/2013
Initial Mechanical Design Completed	12/17/2013	2/06/2014†	2/06/2014
Initial Electrical Design Completed	1/13/2014	3/10/2014†	3/14/2014
Initial Unit Manufacturing and Assembly Completed	2/24/2014	3/17/2014	3/17/2014
Complete Quick Reference Guide	5/9/14	5/9/14	5/12/2014
Production Unit Manufacturing and Assembly Completed	5/9/14	6/25/2014*	6/30/2014
Deliver Developmental Test Report	5/30/2014	7/18/2014*	
Deliver Environmental Test Report	4/18/2014	8/05/2014*	
Deliver Technical Data Package	6/9/2014	8/26/2014	
Prepare for and participate in the IWS-CD and collect system data	3/3/2014	9/26/2014	
Deliver report of IWS-CD results	10/1 /2014	12/13/2014	



† Small delay in design completion. Currently no effect is expected to subsequent milestones
* Date extended based on schedule estimate from environmental testing agent.

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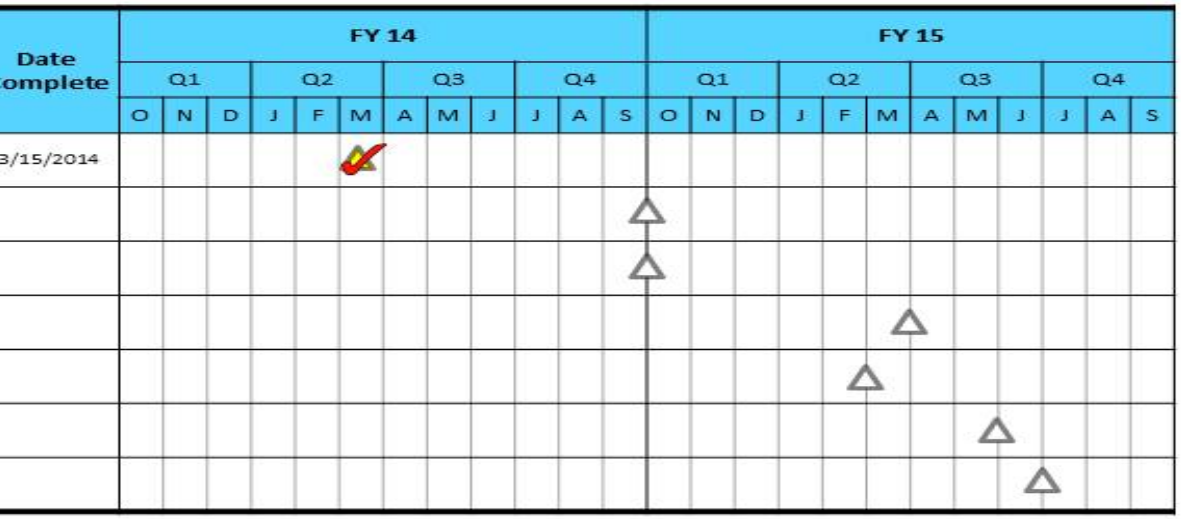
Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Maritime Handheld Explosive Detection (HHED) System Milestones

Milestones	Baseline Date	Current Date	Date Complete
Funding Received	3/15/2014	3/15/2014	3/15/2014
Solicitation Preparation, Down Selection Testing and System Procurement	6/30/2014	9/30/2014	
Test Preparation	6/30/2014	9/30/2014	
Laboratory T&E	12/29/2014	3/27/2015	
Environmental T&E	11/30/2014	2/28/2015	
End User Evaluation and Field Testing	1/16/2015	5/31/2015	
Test Report	4/1/2014	7/1/2015	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

LEGEND

- Planned Actions
- In-Progress Actions
- Completed Actions

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Radar Processing Dynamic Structure Filter

Milestones	Baseline Date	Current Date	Completed Date	FY 14				FY 15				FY 16			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S
Kickoff	08/04/14	08/04/14					△								
Project Plan, Development Environ.								△							
Algorithms Adapted												△			
Verification & Validation													△		
Findings Resolved														△	
IV&V Complete															△
In-Situ Demonstration															△
ECO Complete															
Project Complete															△

PSEP Milestones:

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- Decision/kill points, performance reviews, etc.
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Metrics

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LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

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Evaluation of Radio Frequency Identification (RFID) technology in biological specimen labels stored at ultra-low temperatures Milestones

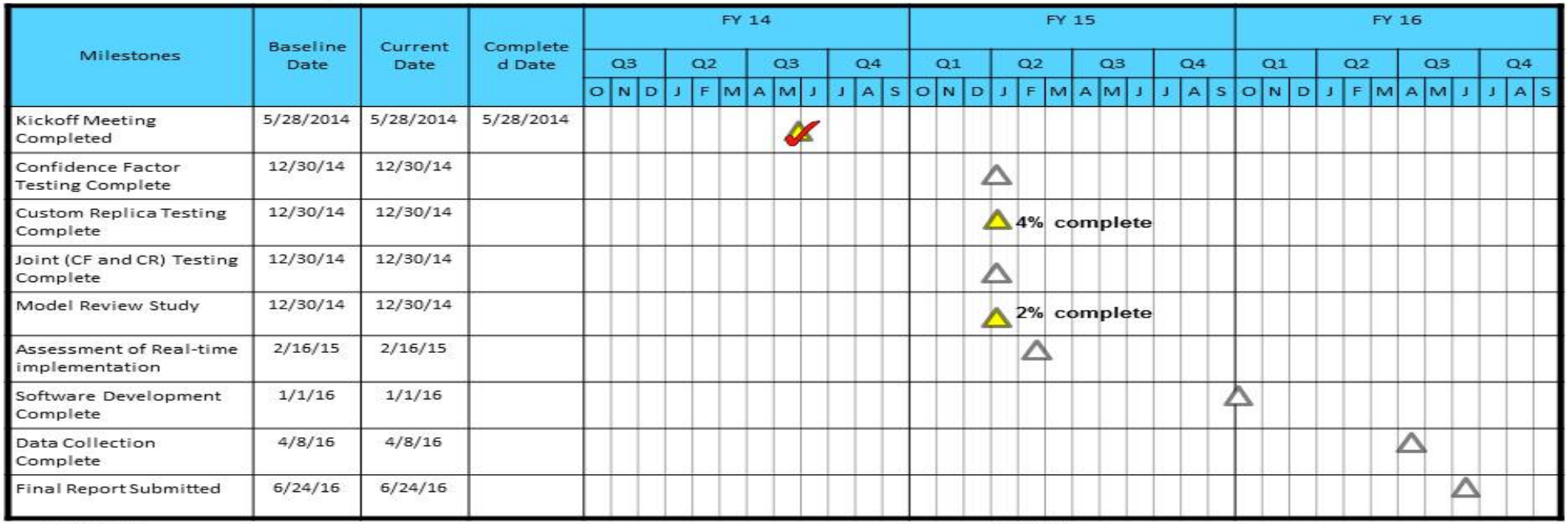
Milestones	Baseline Date	Current Date	Completed Date	FY 14				FY 15				FY 16			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S
Receipt of funding					✓										
Acquisition of Technical Support						✓									
Kickoff Meeting Completed							△								
Acquisition/preparation of Research Materials (supplies) and Development of Methods						△ 80% Complete									
RFID detection Integration into inventory spreadsheet							△								
Initiation of experimental Protocol							△		△ August 2014 to August 2015						
Duplicate CONUS COTS in the OCONUS Georgia Lab and Assist/Train OCONUS testing site										△ October 2014 to September 2015					
Final Report											△ September 2015				

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Sonar Propagation Acoustics Model Transition to Operational Initial Capability Milestones

Milestones	Baseline Date	Current Date	Completed Date
Kickoff Meeting Completed	5/28/2014	5/28/2014	5/28/2014
Confidence Factor Testing Complete	12/30/14	12/30/14	
Custom Replica Testing Complete	12/30/14	12/30/14	
Joint (CF and CR) Testing Complete	12/30/14	12/30/14	
Model Review Study	12/30/14	12/30/14	
Assessment of Real-time implementation	2/16/15	2/16/15	
Software Development Complete	1/1/16	1/1/16	
Data Collection Complete	4/8/16	4/8/16	
Final Report Submitted	6/24/16	6/24/16	



PSEP Milestones:
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- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

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Detection and Assessment IPT

CAPABILITY

- Joint approach to Detection and Assessment portfolio
- Ensure focused and efficient use of limited resources
- Capability gap resolution
- Joint testing for Joint employment
- Inception to transition analysis on all projects to ensure fielding and sustainment for persistent employment

SIGNIFICANT ACCOMPLISHMENTS

- IPT Kickoff meeting scheduled 12 – 13 August

PROJECTED ACCOMPLISHMENTS

- IPT Kickoff Meeting scheduled 12 – 13 August, Lackland AFB, San Antonio, Texas

TRANSITION PLAN

- N/A

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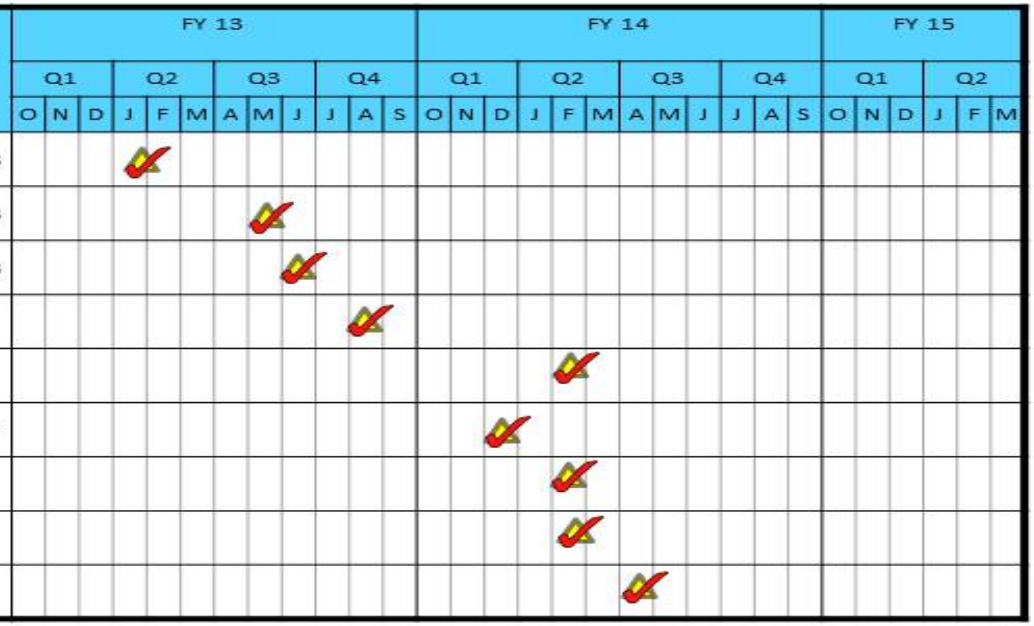
Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

COTS EVALUATION OF GC/MS Milestones

Milestones	Baseline Date	Current Date	Completed Date
Funding Received	10/1/2012	1/14/2013	1/14/2013
Planning and Preparation	1/11/2013	5/29/2013	5/29/2013
Procurement Process For Instrument	1/11/2013	6/12/2013	6/12/2013
Training on GC/MS	1/11/2013	8/14/2013	8/15/13
Evaluation of Sampling Accessories	3/19/2013	12/6/2013	2/2014
Develop Procedure for Analysis of Explosives	2/28/2013	12/24/2013	12/30/13
Assess the Procedure with other Individuals	4/10/2013	1/3/2014	3/2014
Review and Revise Procedure	3/29/2013	1/6/2014	1/28/14
Publish Report and Procedures	9/6/2013	2/14/2014	3/2014



PSEP Milestones:
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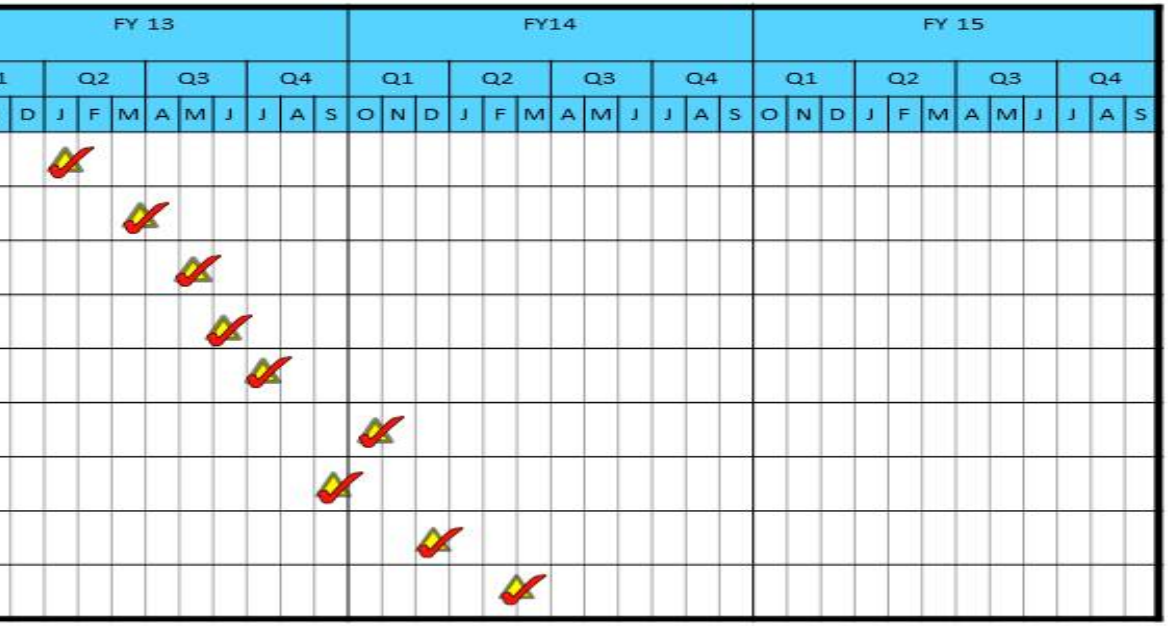
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

X-ray Fluorescence (XRF) and X-ray Diffraction (XRD) Comparative Test and Evaluation Milestones

Milestones	Baseline Date	Current Date	Completed Date
Market Research and System Selection	1/31/2013	1/31/2013	1/31/2013
Test Readiness Review	2/18/2013	3/28/2013	3/28/2013
X-Ray Safety Plan	3/8/2013	5/15/2013	5/15/2013
Contract Manufacturer Participation	1/31/2013	6/7/2013	6/7/2013
Attend System Training	1/28/2013	6/10/2013 & 7/3/2013	7/3/2013
Test and Evaluation	7/5/2013	9/16/2013	11/15/2013
Assess Progress	4/10/2013	8/14/2013	9/4/2013
Post Test Review	8/14/2013	11/20/2013	12/9/2013
Publish Test Report	10/29/2013	1/17/2014	2/2/2014



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Metrics
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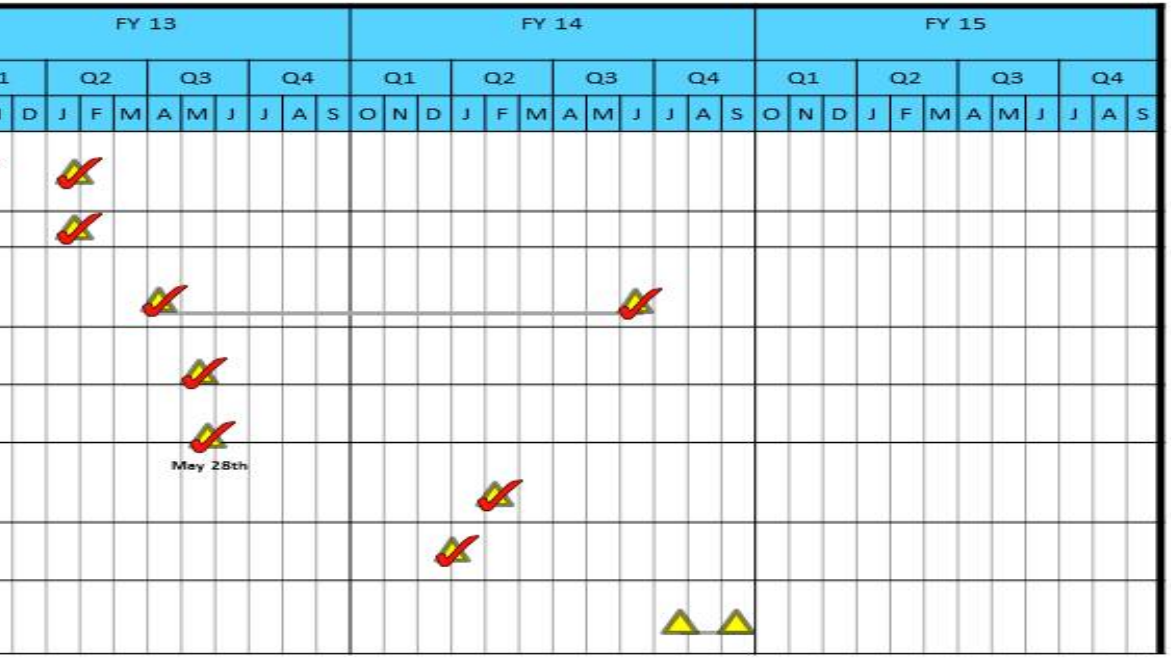
LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Sensor Fusion Milestones

Milestones	Baseline Date	Current Date	Completed Date
Phase 1 – Requirements, Design Concept, and Technical Feasibility	10/22/12 – 3/31/13	N/A	10/22/12 – 4/30/13
End of Phase 1 Report	3/31/13	N/A	4/30/13
Phase 2 – Engineering Development and Prototyping	4/1/13 – 12/15/13	4/31/13 – 06/25/14	6/25/2014
Solid Plastic Concept Model	6/1/13	N/A	5/17/13
Preliminary Design Review (PDR)	6/1/13	N/A	5/28/13
Critical Design Review/Final Thermo Report	Fall 2013	2/14/2014	2/14/14
(Alpha) Prototype Delivery	12/15/13	12/31/13	12/31/13
NSWC IHEODTD Testing	12/15/13 – 3/15/13	07/07/14– 09/30/14	



PSEP Milestones:
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Metrics
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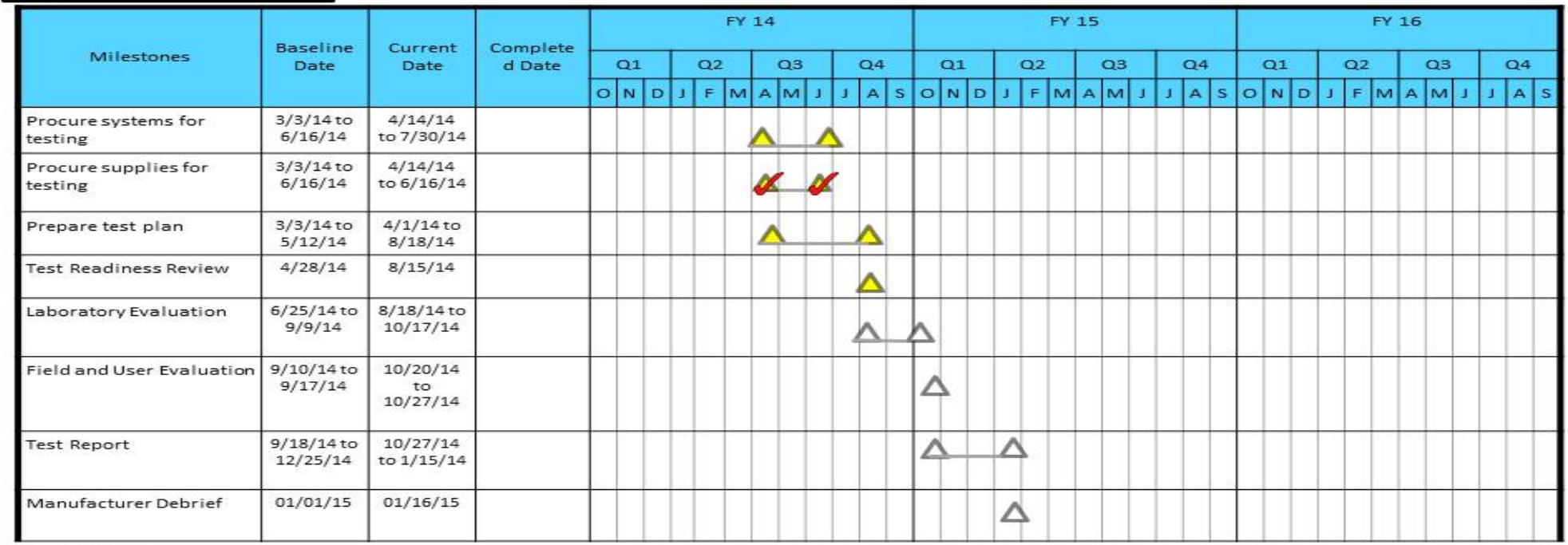
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

ACE-ID/HAZMATID Milestones

Milestones	Baseline Date	Current Date	Completed Date
Procure systems for testing	3/3/14 to 6/16/14	4/14/14 to 7/30/14	
Procure supplies for testing	3/3/14 to 6/16/14	4/14/14 to 6/16/14	
Prepare test plan	3/3/14 to 5/12/14	4/1/14 to 8/18/14	
Test Readiness Review	4/28/14	8/15/14	
Laboratory Evaluation	6/25/14 to 9/9/14	8/18/14 to 10/17/14	
Field and User Evaluation	9/10/14 to 9/17/14	10/20/14 to 10/27/14	
Test Report	9/18/14 to 12/25/14	10/27/14 to 1/15/14	
Manufacturer Debrief	01/01/15	01/16/15	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
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Metrics
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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P163 / *Nuclear and Conventional Physical Security*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Detection & Assessment Integrated Process Team				
Detection & Assessment Integrated Process Team	4	2014	4	2017
Joint Explosive Detection Equipment				
Joint Explosive Detection Equipment	1	2014	1	2021
Hailing Acoustic, Laser and Light Tactical System				
Hailing Acoustic, Laser and Light Tactical System	1	2014	1	2015
Handheld Explosive Detection System for Maritime Environment				
Handheld Explosive Detection System for Maritime Environment	2	2014	3	2015
Radar Processing Dynamic Structure Filter				
Radar Processing Dynamic Structure Filter	4	2014	4	2016
Radio Frequency Identification Technology in Biological Specimen Labels				
Radio Frequency Identification Technology in Biological Specimen Labels	2	2014	4	2016
Sonar Propagation Acoustics Model Transition to Operational Initial Capability				
Sonar Propagation Acoustics Model Transition to Operational Initial Capability	3	2014	3	2016

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P042: *CNT Rad/Nuc Passive Defense SDD*	1.016	3.903	3.665	3.421	-	3.421	3.317	5.804	5.733	7.813	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project establishes a Defense-wide Countering Nuclear Threats (CNT) Materiel development Program. The CNT acquisition strategy directly applies to a Joint requirement for CNT materiel development and addresses the materiel and sustainment gaps for general purpose Joint Forces, including the US Army 20th Support Command and Navy Visit, Board, Search, and Seizure, as well as the Technical Support Groups; NIMBLE ELDER and the US Special Operations Command where required.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: CNT Rad/Nuc Passive Defense	3.903	3.665	3.421

Description: Advanced Development of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter).

The Radiological Detection System will provide a ruggedized Radiation Detection, Indication, and Computation for real time gamma radiation monitoring and low energy x-ray, beta, alpha, and neutron detection.

The Joint Personal Dosimeter will provide a joint solution to increase capability and reduce life-cycle costs.

Both systems will address Operation TOMODACHI lessons learned for common, interoperable equipment with adequate sensitivity and common units of measure.

FY 2015 Accomplishments:
Continue with the development of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)

FY 2016 Plans:
Continue with the development of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)

FY 2017 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
complete the development of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)			
Accomplishments/Planned Programs Subtotals	3.903	3.665	3.421

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The program performance metrics are established/approved through the Countering Nuclear Threats Program Manager. The cost, schedule and technical progress is reviewed on a quarterly basis. Performance variances are addressed and corrective action(s) is(are) implemented as necessary.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Radiological Detection System	Sub Allot	Joint Product Manager - Rad / Nuc Defense : Aberdeen, MD	0.000	0.585		0.449		0.205		-		0.205	-	-	-
Joint Personal Dosimeter	Sub Allot	Joint Product Manager - Rad / Nuc Defense : Aberdeen, MD	1.016	3.318		3.216		3.216		-		3.216	-	-	-
		Subtotal	1.016	3.903		3.665		3.421		-		3.421	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.016	3.903		3.665		3.421		-		3.421	-	-	-

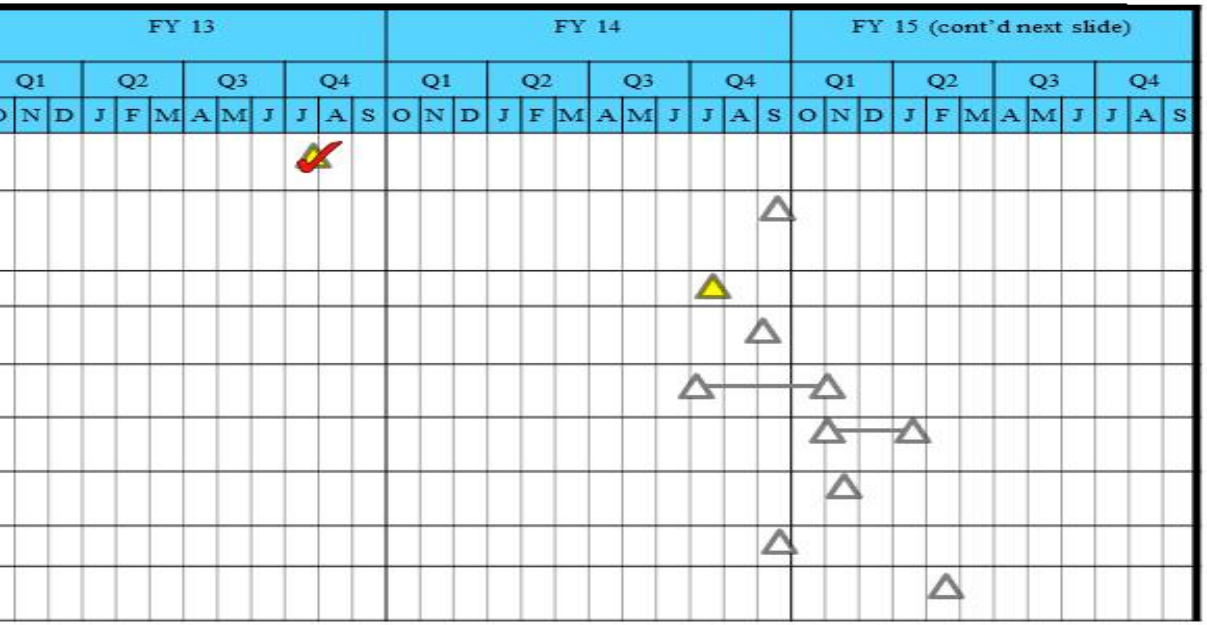
Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			July 2013
Navy Battlefield Dosimeter System Contract Award	Mar 2014	Sep 2014	
IMS/IMP	Jan 2013	Jul 2014	
Performance Specification	Mar 2014	Sep 2014	
Installation Study	Apr 2014 (start)	July 2014 (start)	
NVLAP Accreditation	May 2014 (start)	Nov 2014 (start)	
Phase 2 Close-out	May 2014	Nov 2014	
Critical Design Review	July 2014	Sep 2014	
Phase 1 Close-out	Dec 2014	Feb 2015	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

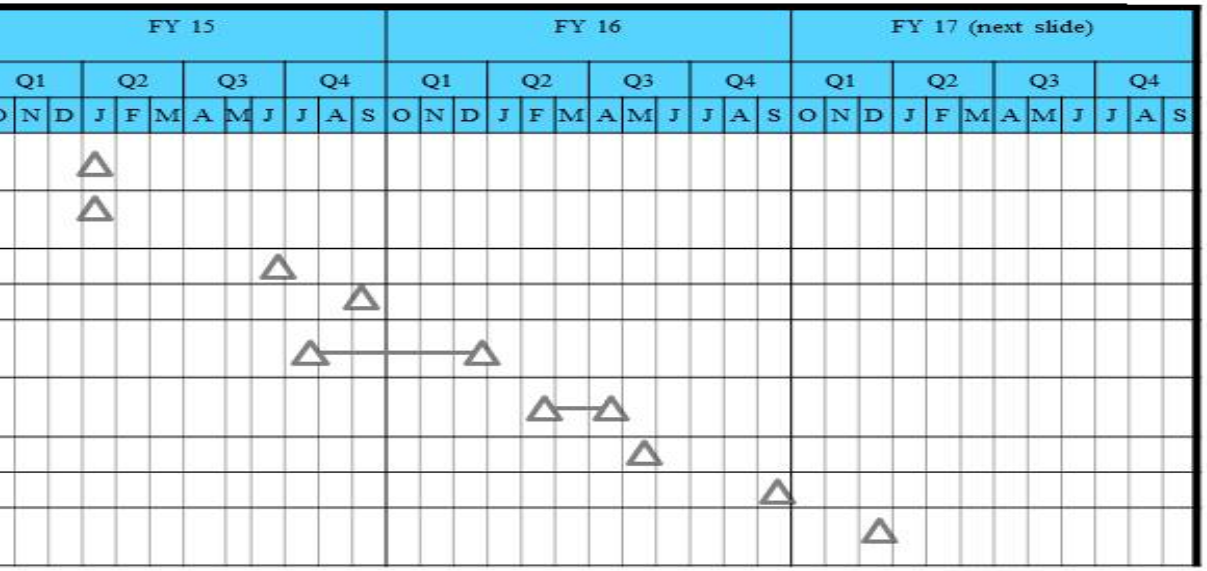
Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
System Verification Review	July 2015	Jan 2015	
Functional Configuration Audit	Mar 2016	Jan 2015	
JPD MS C	Oct 2016	Jun 2015	
Phase 3 Close-out	Sep 2015	Sep 2015	
Product Qualification Testing	Dec 2016 (start)	Jul 2015 (start)	
IOT&E	July 2016 (start)	Feb 2016 (start)	
Log Demo	Sep 2016	May 2016	
JILA Memo	Feb 2017	Sep 2016	
Full Rate Production Decision	Apr 2017	Dec 2017	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			Jan 2013
IMS/IMP	July 2013	July 2013	July 2013
Market Survey	July 2013	July 2013	July 2013
RMA Report	Sept 2013	Nov 2013	Nov 2013
Acquisition Decision Memorandum	Sept 2013	Nov 2013	Nov 2013
Phase 1 Close-out	Oct 2013	Oct 2013	Oct 2013
Performance Specification and RFP release	Nov 2013	Aug 2014	Aug 2014
Contract Award	Mar 2014	Dec 2014	
Final Requirements Review	Nov 2013	Dec 2014	

FY 13 (Q1: O N D; Q2: J F M; Q3: A M J; Q4: J A S)
FY 14 (Q1: O N D; Q2: J F M; Q3: A M J; Q4: J A S)
FY 15 (cont'd on next chart) (Q1: O N D; Q2: J F M; Q3: A M J; Q4: J A S)

PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

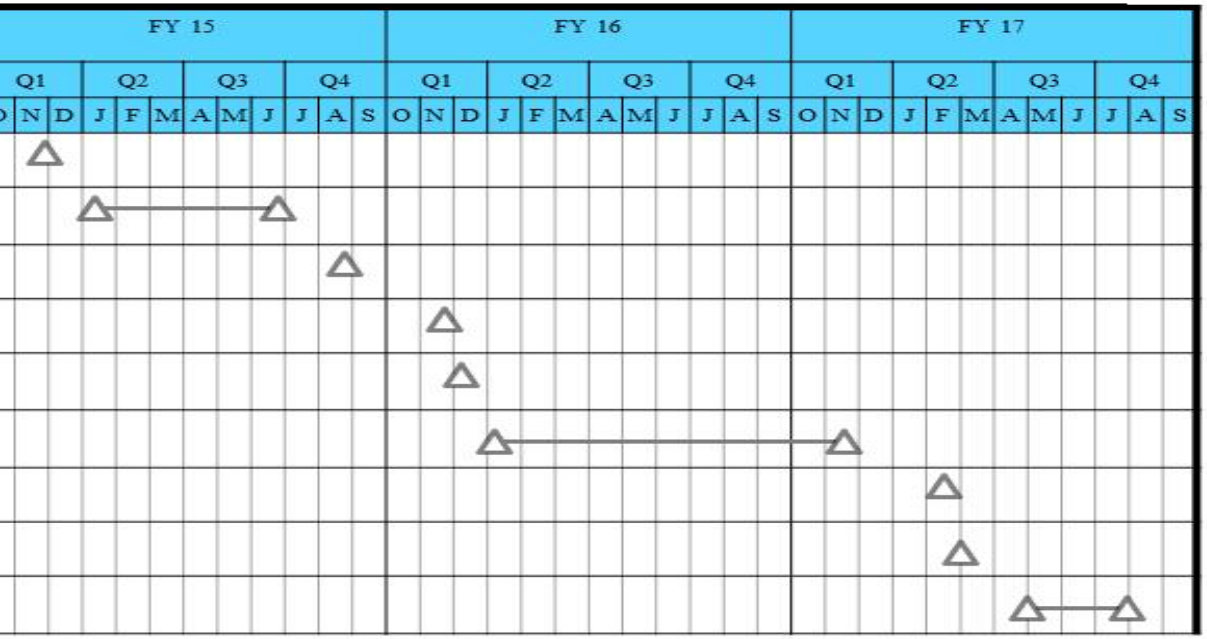
Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Phase 2 Close-out	Jun 2014	Nov 2014	
Contractor development + Ctr testing	Jun 2014	Jan 2015 (start)	
Critical Design Reviews	Jan 2015	Aug 2015	
Test Article Deliveries	Feb 2015	Nov 2015	
Phase 3 Close-out	Mar 2015	Dec 2015	
Developmental Testing and OA conducted	Mar 2015	Jan 2016 (start)	
Test Report	Mar 2016	Feb 2017	
Phase 4 Close-out	Mar 2016	Feb 2017	
LRIP Option Award and build	May 2016	Apr 2017 (start)	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Radiological Detection System (RDS) Milestones

Milestones	Baseline Date	Current Date	Completed Date
LRIP Units delivered	Mar 2017	Aug 2017	
Phase 5 Close-out	Apr 2017	Aug 2017	
First Article Test Planning and Test	May 2017	Jul 2017 (start)	
Log Demo (including training) conducted	Jul 2017	Sep 2018 (start)	
MOT&E (including training) conducted	Oct 2017	Aug 2018 (start)	
FRP OTA Evaluation report	May 2018	Oct 2018 (start)	
JILA Report	Feb 2018	Nov 2018 (start)	
FRP Decision	Jun 2018	Feb 2019	

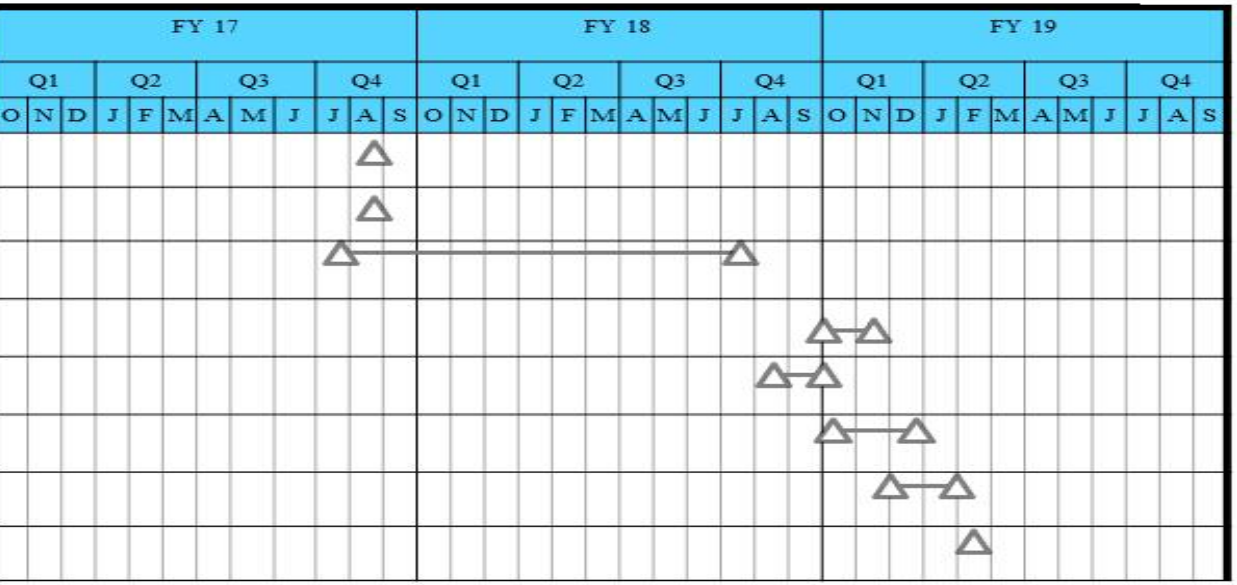


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604161D8Z / *Nuclear and Conventional Physical Security/Countering Nuclear Threats*	**Project (Number/Name)** P042 / *CNT Rad/Nuc Passive Defense SDD*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Radiological Detection System				
Radiological Detection System	1	2014	2	2019
Joint Personal Dosimeter				
Joint Personal Dosimeter	4	2014	1	2017

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	889.028	95.588	88.660	181.303	0.000	181.303	203.907	222.404	225.456	229.853	Continuing	Continuing
P164: *Hypersonic Glide Experiment and Concepts Demonstration Support*	368.275	2.849	2.617	2.000	0.000	2.000	2.000	2.000	2.000	2.000	Continuing	Continuing
P166: *Alternate Re-Entry System/Warhead Engineering*	421.262	67.739	86.043	174.013	0.000	174.013	197.598	216.347	219.250	223.208	Continuing	Continuing
P167: *Test Range Development*	62.446	0.000	0.000	2.000	0.000	2.000	1.000	1.000	1.000	1.000	Continuing	Continuing
P168: *OSD CPGS Studies*	37.045	25.000	0.000	3.290	0.000	3.290	3.309	3.057	3.206	3.645	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) was established to develop and demonstrate technologies and applications that advance conventional prompt global strike (CPGS) warfighting capabilities. The program uses a national team with participation from the Services, Agencies, national research laboratories, and further involvement of competitive industry. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events as well as DoD budgets. In FY 2017, as in previous years, funding for the individual Service initiatives will be contingent upon their abilities to execute and achieve satisfactory progress towards project goals as determined by the CPGS portfolio manager.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	95.626	78.817	183.905	0.000	183.905
Current President's Budget	95.588	88.660	181.303	0.000	181.303
Total Adjustments	-0.038	9.843	-2.602	0.000	-2.602
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.038	-			
• SBIR/STTR Transfer	-	-			
• FY16 FFRDC	-	-0.157	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense					Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*		
• Efficiency Reductions	-	-	-0.580	-	-0.580
• Economic Assumptions	-	-	-1.407	-	-1.407
• Other Reductions	-	-	-0.615	-	-0.615

Change Summary Explanation

CPGS program funding aligned with CPGS program plan.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*	Project (Number/Name) P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P164: *Hypersonic Glide Experiment and Concepts Demonstration Support*	368.275	2.849	2.617	2.000	0.000	2.000	2.000	2.000	2.000	2.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) was established to develop and demonstrate technologies and applications that advance conventional prompt global strike (CPGS) warfighting capabilities. The program uses a national team with participation from the Services, Agencies, national research laboratories, and further involvement of competitive industry. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events as well as DoD budgets. In FY 2017, as in previous years, funding for the individual Service initiatives will be contingent upon their abilities to execute and achieve satisfactory progress towards project goals as determined by the CPGS portfolio manager.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Hypersonic Glide Experiments and Concept Demonstration Development/Support	2.849	2.617	2.000
Description: This sub-project develops technologies and applications that could lead to a system with the following characteristics: effects on targets in a very short-period of time from execution order; non-ballistic flight over the majority of the flight path; positive control from launch to impact; adequate cross-range/ maneuverability to avoid overflight issues; controlled stage drop over Broad Ocean Area. This sub-project also oversees development of non-nuclear warhead technologies to defeat time-sensitive targets for near and longer-term CPGS applications. The technologies developed will have cross-Service and cross-concept applicability and will be developed through close coordination among DoD components. This activity will support both ground and flight tests, and provide all national data to inform a potential acquisition program.			
FY 2015 Accomplishments: - Conducted trade studies to evaluate system alternatives, affordability, end-to-end system concepts that will study a weaponized integrated system complete with system architecture, and industrial manufacturing readiness - Continued aerodynamic and weapon risk reduction and technology maturation efforts through ground and wind tunnel tests to improve modeling and simulation capabilities and technology readiness, assessing readiness to conduct component technology tests of alternative warheads			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Updated the Technology Development Strategy and System Engineering documentations based on updated CPGS community engineering and test data, trade studies and on-going risk reduction/technology development efforts - Completed planning for low cost terminal phase delivery vehicle testing to include analysis of guidance, navigation, control, aerodynamic, and materials performance to CPGS mission terminal area requirements ***FY 2016 Plans:*** - Conduct trade studies to evaluate system alternatives, affordability, end-to-end system concepts that will study a weaponized integrated system complete with system architecture, and industrial manufacturing readiness - Continue aerodynamic and weapon risk reduction and technology maturation efforts through ground and wind tunnel tests to improve modeling and simulation capabilities and technology readiness, assessing readiness to conduct component technology tests of alternative warheads - Update the Technology Development Strategy and System Engineering documentations based on updated CPGS community engineering and test data, trade studies, and on-going risk reduction/technology development efforts - Continue Systems Engineering support to CPGS program and acquisition. Apply support to Integrated Product Teams to facilitate judgments of feasibility and risks of all CPGS concepts. Continue to support outreach and strategic messaging to entire CPGS community and COCOMs. ***FY 2017 Plans:*** - Conduct trade studies to evaluate system alternatives, affordability, end-to-end system concepts that will study a weaponized integrated system complete with system architecture, and industrial manufacturing readiness - Continue aerodynamic and weapon risk reduction and technology maturation efforts through ground and wind tunnel tests to improve modeling and simulation capabilities and technology readiness, assessing readiness to conducted integrated penetrator component technology tests - Continue Systems Engineering support to CPGS program and acquisition. Apply support to Integrated Product Teams to facilitate judgments of feasibility and risks of all CPGS concepts. Continue to support outreach and strategic messaging to entire CPGS community and COCOMs.			
Accomplishments/Planned Programs Subtotals	2.849	2.617	2.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Glide Experiment Support	Allot	Space and Missile Center : Los Angeles, CA	368.275	2.849		2.617		2.000		-		2.000	-	-	-
		Subtotal	368.275	2.849		2.617		2.000		-		2.000	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	368.275	2.849		2.617		2.000		-		2.000	-	-	-

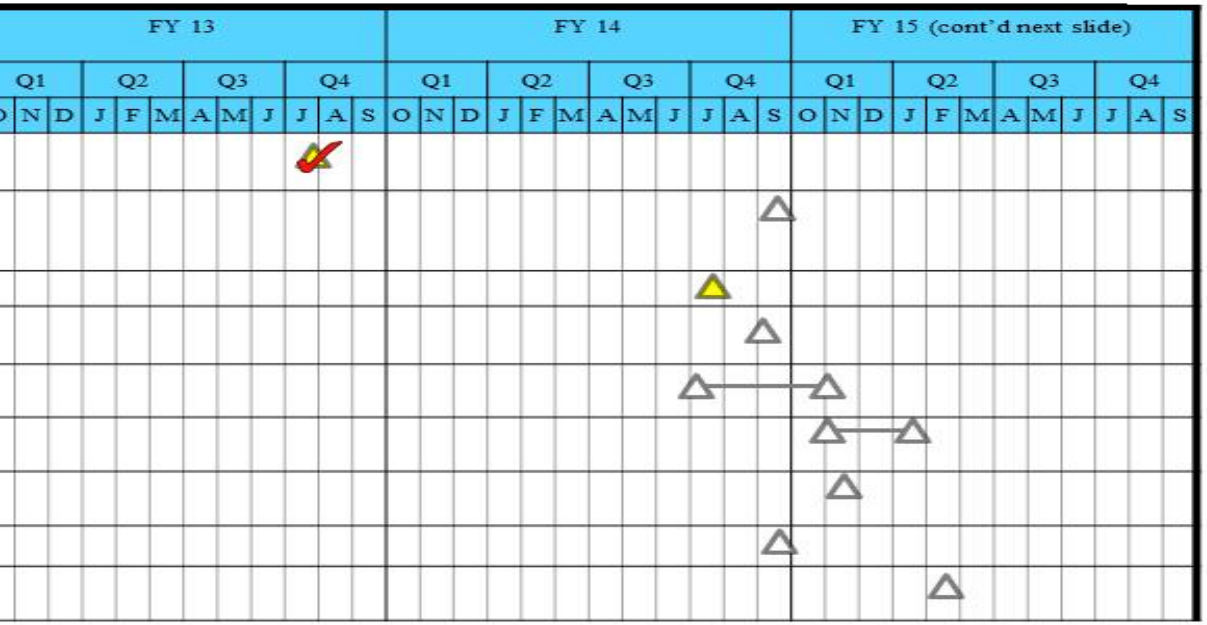
Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*

LEGEND
- Planned Actions
- In-Progress Actions
- Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date
Project Initiation / Kick-off Meeting			July 2013
Navy Battlefield Dosimeter System Contract Award	Mar 2014	Sep 2014	
IMS/IMP	Jan 2013	Jul 2014	
Performance Specification	Mar 2014	Sep 2014	
Installation Study	Apr 2014 (start)	July 2014 (start)	
NVLAP Accreditation	May 2014 (start)	Nov 2014 (start)	
Phase 2 Close-out	May 2014	Nov 2014	
Critical Design Review	July 2014	Sep 2014	
Phase 1 Close-out	Dec 2014	Feb 2015	



PSEP Milestones:
- Completion of major phases, task items, or deliverables
- Decision/kill points, performance reviews, etc.
- Demonstrations/Events (Please provide start/end dates as depicted)
- *Please use this format. Minor changes acceptable (i.e. annotations)

Metrics
- Schedule metrics will be based off of the "Current" Date
- Changes of current dates need to be noted in issues/changes

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P164 / *Hypersonic Glide Experiment and Concepts Demonstration Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Hypersonic Glide Experiment Support	1	2014	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*	Project (Number/Name) P166 / *Alternate Re-Entry System/Warhead Engineering*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P166: *Alternate Re-Entry System/Warhead Engineering*	421.262	67.739	86.043	174.013	0.000	174.013	197.598	216.347	219.250	223.208	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) was established to develop and demonstrate technologies and applications that advance conventional prompt global strike (CPGS) warfighting capabilities. The program uses a national team with participation from the Services, Agencies, national research laboratories, and further involvement of industry. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events as well as DoD budgets. In FY 2017, as in previous years, funding for the individual Service initiatives will be contingent upon their abilities to execute and achieve satisfactory progress towards project goals as determined by the CPGS portfolio manager.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Alternative Re-Entry System/Warhead Engineering and Delivery Vehicle Options/Development	67.739	86.043	174.013
Description: This sub-project will test and evaluate alternative booster and delivery vehicle options and will assess the feasibility of producing an affordable solution to fill the CPGS capability gap. It will mature technologies that could lead to advanced systems with the following characteristics: effects on targets in a very short-period of time from execution order; non-ballistic flight over the majority of the flight path; positive control from launch to impact; adequate cross-range/maneuverability to avoid over flight issues; and controlled stage drop over Broad Ocean Area. The technologies developed will have cross-Service and cross-concept applicability and will be developed through close coordination among DoD components. This activity will support both ground and flight tests, and provide all national data to inform a potential acquisition program.			
FY 2015 Accomplishments: - Continued AHW Flight Test 2 post-Flight test data analysis and complete Failure Review Board - Completed Preliminary Design Review for FE-1 through collaboration with the national CPGS team - Completed Critical Design Review for FE-1 through collaboration with national CPGS team - Leveraged AHW FT-2 engineering workup, design algorithms and lessons learned for application to FE-1 - Began integrated system-level test, evaluation, and assembly for FE-1			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P166 / *Alternate Re-Entry System/Warhead Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Supported development of future flight test systems for CPGS concepts as required ***FY 2016 Plans:*** - Complete Critical Design Review for FE-1 through collaboration with national CPGS team - Leverage AHW FT-2 engineering workup, design algorithms and lessons learned for application to FE-1 - Begin integrated system-level test, evaluation, and assembly for FE-1 - Support development of future flight test systems for CPGS concepts as required - Conduct System Requirements Review (SRR) and begin design for objective FE-2 Booster (Competitive Industry led effort) ***FY 2017 Plans:*** - Finalize manufacturing and testing of Hypersonic Glide Body and Booster to be used in FE-1 - Continue intermediate range objective booster development for FE-2 with competitive industry; to include hardware procurement and fabrication - Support development of future flight test systems for CPGS concepts as required - Update the Technology Development Strategy and system engineering documentation based on updated CPGS engineering and test data, trade studies, and on-going risk reduction/technology development efforts			
Accomplishments/Planned Programs Subtotals	67.739	86.043	174.013

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*	Project (Number/Name) P166 / *Alternate Re-Entry System/Warhead Engineering*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Alternative Reentry System/Warhead Engineering and Delivery Vehicle Options/ Development	Allot	Army Space and Missile Defense Center/Navy Strategic Systems Program : Huntsville AL/Washington DC	421.262	67.739		86.043		174.013		-		174.013	Continuing	Continuing	-
		Subtotal	421.262	67.739		86.043		174.013		-		174.013	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	421.262	67.739		86.043		174.013		-		174.013	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P166 / *Alternate Re-Entry System/Warhead Engineering*

P166 CPGS Flight Experiment 1 (order 10)

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Planning/Design																								
Fabrication/Integration	■	■	■	■																				
Test Execution					■	■	■	■																
Post Test Analysis & Reporting					■	■	■	■	■	■	■	■												

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P166 / *Alternate Re-Entry System/Warhead Engineering*

P166 CPGS Flight Experiment 2 (order 20)

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Planning/Design					■	■	■	■																
Fabrication/Integr.									■	■	■	■												
Test Execution													■	■	■	■								
Post Test Analysis & Reporting																	■	■	■	■	■	■	■	■

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P166 / *Alternate Re-Entry System/Warhead Engineering*

P166 Alternate Re-Entry System/Warhead Engineering

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Trade Studies, Ground Testing and Systems Engineering																								

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P166 / *Alternate Re-Entry System/Warhead Engineering*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Navy Flight Experiment 1	1	2014	4	2017
Navy Flight Experiment 2	4	2017	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*	Project (Number/Name) P167 / *Test Range Development*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P167: *Test Range Development*	62.446	0.000	0.000	2.000	0.000	2.000	1.000	1.000	1.000	1.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) was established to develop and demonstrate technologies and applications that advance conventional prompt global strike (CPGS) warfighting capabilities. The program uses a national team with participation from the Services, Agencies, national research laboratories, and further involvement of industry. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events as well as DoD budgets. In FY 2017, as in previous years, funding for the individual Service initiatives will be contingent upon their abilities to execute and achieve satisfactory progress towards project goals as determined by the CPGS portfolio manager.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Test Range Development	0.000	-	2.000
Description: This sub-project will complete design, assembly and delivery of power/telemetry subsystems; assemble and integrate components to check command/control and verify range safety functions. ***FY 2015 Accomplishments:*** - Funding for this activity in FY 2015 was executed out of Project Code 166 as part of the CPGS flight test programs ***FY 2017 Plans:*** - Continue to improve telemetry collection and range safety infrastructure in preparation for future flight testing of system concepts - Continue to support test range infrastructure for long term use			
Accomplishments/Planned Programs Subtotals	0.000	-	2.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P167 / *Test Range Development*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P167 / *Test Range Development*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Range Development	Allot	Army Space and Missile Defense Command : Huntsville, AL	62.446	0.000		0.000		2.000		-		2.000	-	-	-
		Subtotal	62.446	0.000		0.000		2.000		-		2.000	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	62.446	0.000		0.000		2.000		-		2.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P167 / *Test Range Development*

P167 Test Range Development

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Support Range Safety and Telemetry Efforts																								

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P167 / *Test Range Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Test Range Development	1	2014	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / *Prompt Global Strike Capability Development*	Project (Number/Name) P168 / *OSD CPGS Studies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P168: *OSD CPGS Studies*	37.045	25.000	0.000	3.290	0.000	3.290	3.309	3.057	3.206	3.645	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) was established to develop and demonstrate technologies and applications that advance conventional prompt global strike (CPGS) warfighting capabilities. The program uses a national team with participation from the Services, Agencies, national research laboratories, and further involvement of industry. Program emphasis is on demonstrating component and subsystem technology maturity with risk reduction initiatives highlighted by flight tests. The program funds the design, development, and experimentation of boosters, payload delivery vehicles (PDVs), non-nuclear warheads, thermal protection systems, guidance systems, test range modernization, and mission planning and enabling capabilities. To support these development activities, the program procures modeling and simulation capabilities, ground testing, command and control interfaces, test range support, and launch system infrastructure. Additionally, expert resources address strategic policy and treaty issues. Program timing will be driven by the outcome of flight and ground test events as well as DoD budgets. In FY 2017, as in previous years, funding for the individual Service initiatives will be contingent upon their abilities to execute and achieve satisfactory progress towards project goals as determined by the CPGS portfolio manager.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: OSD CPGS Studies	25.000	-	3.290
Description: This sub-project supports emergent CPGS study efforts. In addition, it supports the application of the Prompt Global Strike Analysis of Alternatives (AoA) results and any AoA updates; requirements development; CPGS basing alternatives; analysis and defining of mission enabling technologies; and measures to avoid conventional missile launch ambiguity with nuclear weapon systems. Finally, it supports administrative activities associated with the management and execution of this Program Element.			
FY 2015 Accomplishments: - Conducted cost assessment studies for future system development - Conducted booster system integration studies - Conducted lethality and warhead fuzing studies - Continued thermal and aerodynamic modeling and simulation - Continued senior steering group panel review and strategic messaging activities - Continued program management reviews, ground test status and planning summits, and administrative support of ground test integrated product teams			
FY 2017 Plans: - Continue cost assessment studies for future system development - Continue lethality and warhead fuzing studies			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P168 / *OSD CPGS Studies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue thermal and aerodynamic modeling and simulation - Continue senior steering group panel review and strategic messaging activities - Conduct command, control, and operational overlay exercises in parallel with CPGS flight tests - Continue program management reviews, ground test status and planning summits, and administrative support of ground test integrated product teams			
Accomplishments/Planned Programs Subtotals	25.000	-	3.290

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P168 / *OSD CPGS Studies*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CPGS Studies	Allot	Navy Strategic Systems Program/ SMDC : Washington, DC/ Huntsville, AL	37.045	25.000		0.000		3.290		-		3.290	-	-	-
		Subtotal	37.045	25.000		0.000		3.290		-		3.290	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.045	25.000		0.000		3.290		-		3.290	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P168 / *OSD CPGS Studies*

P168 CPGS Studies

Project Management, Studies, Analyses, Operational Assessments and Acquisition Planning	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604165D8Z / *Prompt Global Strike Capability Development*	**Project (Number/Name)** P168 / *OSD CPGS Studies*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Acquisition Planning	1	2016	4	2019
Operational Assessment	1	2016	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	52.049	19.556	14.257	16.288	-	16.288	16.078	14.685	14.886	15.177	Continuing	Continuing
771: *Link-16 Tactical Data Link (TDL) Transformation*	52.049	19.556	10.332	11.793	-	11.793	11.978	10.685	10.886	11.077	Continuing	Continuing
105: *Cyber Capability & Platform Resilience*	-	0.000	3.925	4.495	-	4.495	4.100	4.000	4.000	4.100	Continuing	Continuing

A. Mission Description and Budget Item Justification

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	17.537	14.285	16.521	-	16.521
Current President's Budget	19.556	14.257	16.288	-	16.288
Total Adjustments	2.019	-0.028	-0.233	-	-0.233
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.593	-			
• SBIR/STTR Transfer	-0.574	-			
• FY16 FFRDC	-	-0.028	-	-	-
• Efficiency Reductions	-	-	-0.052	-	-0.052
• Economic Assumptions	-	-	-0.126	-	-0.126
• Other General Reductions	-	-	-0.055	-	-0.055

Change Summary Explanation

Received end of year funding that inflates our FY15 position. Increased requirements in Cyber was the reason for the influx of funds at the end of FY15. This helps bridge the gap with the decrease of our FY16 funds. Efforts are ongoing between the two fiscal years and in the future.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	Project (Number/Name) 771 / *Link-16 Tactical Data Link (TDL) Transformation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
771: *Link-16 Tactical Data Link (TDL) Transformation*	52.049	19.556	10.332	11.793	-	11.793	11.978	10.685	10.886	11.077	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds will be used to provide technical and systems engineering, acquisition assistance and management oversight of critical Command, Control, Communications (C3), non-intelligence space, and cyber programs, projects and activities to maximize the return on investment in information technology resources and assist programs to be successful as the Department migrates to a structure implementing Joint Information Environment (JIE) technical standards. The Joint Tactical Information Distribution System (JTIDS) funding fulfills the Department's requirement for joint and combined network-enabled tactical data link (TDL) capabilities, netcentric/JIE communications which comply to standards for interoperability and seamless integration with joint communication systems as well as the mission functionality that uses these systems. Also, these funds underwrite assessment of design and procurement and execution correction of critical information systems from initial definition through development to successfully delivered configurations. Funds provide expertise supporting technical oversight of design, performance and cost parameters of key Defense IT and National Security Systems and supporting infrastructure including critical cyber assessments. Resources in this program fund architecture design and development, portfolio management, enterprise-wide systems engineering and operational impact analyses related to C3, non-intelligence space, and cyber activities. Typical deliverables associated with the instantiation of net-centric capabilities for these mission areas include network and vulnerability assessments, migration plans, investment strategies, architectures, roadmaps and technical guidance documentation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Common Joint Tactical Information Initiatives	19.556	10.332	11.793
FY 2015 Accomplishments: - Cyber Investment Management: Synchronized and coordinated cyberspace acquisition activities, conduct quantitative assessments, and ensure cyberspace investments align with Department priorities, required capabilities and evolving cyber threats. Provided support of the Cyber Investment Management Board and develop implementation guidance and associated direction. Conducted CIMB/CCT meetings to refine the cyber investment portfolio and to identify strategic cyber issues the DoD will face in the future. - Refined the Cyber investment portfolio results, ensuring return on investment and risk ultimately leading to an optimization phase focusing on process improvement is included. - Conducted investment analysis of the DoD-wide Cyber Special Access Program (SAP) portfolio to include return on investment and risk analysis. - Utilized the results of the Cyber Rapid Acquisition Process Pilots to implement the new rapid cyber acquisition processes across DoD, ensuring DoD Acquisition Policy is updated to reflect processes.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Managed Cyber security Guidebook for Program Managers. Contributed to any follow on efforts to revise policy or guidance regarding Cyber security within the Acquisition process. - Oversaw implementation of the Cyber Situational Awareness Evaluation of Alternatives (EoA) (phase I and II) recommendations. - Conducted EoA on Cyber Command and Control to determine C2 tools for Cyber Operations. - Assessed, developed report and provided recommendations on Cyber vulnerabilities of Department of Defense weapon systems and tactical communications systems; provided report to Congress and began implementation of recommendations to ensure Platform Resilience/Mission Assurance (PR/MA). - Enacted a Cyber Range Focal point to be the central coordination point and oversight for Cyber Ranges that support Cyber Training and Testing & Evaluations. - Implemented DoD Cyber Range strategy, working with T&E and DOT&E and JS. - Conducted technical analysis to determine tools necessary to help collect, measure, assess DCO/OCO effectiveness and suitability in a Cyber Range Environment and conduct an EoA for Cyber Range capabilities. - Conducted OCO/DCO Requirements and Architecture Analysis in collaboration with USCYBERCOM: supported flow of requirements from Cyber Attack ICD and CND ICD to more detailed requirements for OCO and DCO capabilities in support of IS-CDD development; developed and refined OCO / DCO architectures as required to support equipping of the cyber mission force. - Acquisition Management and oversight: Provided technical assistance in developing acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction. Conducted technical assessments and provided programmatic recommendations across DASD functional areas to address interoperability gaps and work early in the systems engineering - Common Data Link (CDL) Principal Staff Assistant: Continued to coordinate with CDL Executive Agent to develop and maintain a technology roadmap and terminal database to improve interoperability, configuration management, and focused technology investments. Continued to oversee development and validation of cryptographic core modernization, Small Unmanned Aircraft System (SUAS) Common Data Link (CDL) terminals, CDL waveform, CDL Compliance Test Tool, and Reference Implementation Laboratory development efforts. Completed documentation for Remote Video Terminal (RVT) waveforms to enable competition of CDL procurements. Continued development of an enterprise transition strategy to modernize DoD ISR waveforms to converge on a DoD standard for tactical ISR communications. Continued to oversee programmatic efforts to modernize to attain CDL policy and statutory compliance. Continue planning and conduct of CDL SRP and IPT meetings to develop and refine the CDL investment portfolio and to identify strategic ISR communications issues the DoD will face in the future. Conducted analysis of Airborne ISR communications transport infrastructure in coordination with Joint Staff, Services and Combatant Commands in order to identify a way ahead for establishing an effective/efficient global enterprise capability. - FAB T: Continued to provide programmatic analysis, technical reviews, and assessments of the FAB-T program and Presidential and National Voice Conferencing (PNVC) program to reduce development, integration, and procurement risks. Provided assessments and conclude all preparations for Milestone C DAB, including ADMs, ICE, APB, TEMP, PPP, and SEP as well as other acquisition documents. - AEHF: Provided programmatic analysis, technical reviews, and assessments of the AEHF program			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
to reduce development, integration, and procurement risks. Provided risk assessments as the program completes DT&E and enters dedicated OT&E phases of MOT&E, and fielding of more mature versions of the Mission Planning Element. Continued development of the Key Management Infrastructure (KMI) needed to replace the Electronic Key Management System (EKMS). - EPS: Provided programmatic analysis, technical reviews, and assessments of the EPS program to reduce development, integration, and procurement risks. Assessed risk as the TT&C program goes through its final development and test process. - Wideband SATCOM Capability: Completed development of response to NDAA Section 1603 on Single Acquisition Agent for Commercial Wideband SATCOM. - National Leadership Command Capability (NLCC): Continued to act as primary action office for AT&L in his role as co-chair of the Council on Oversight of the National Leadership Command, Control, and Communications System (CONLC3S). Worked directly with the Executive Secretariat (DOD CIO) to oversee all aspects of preparation and conduct of CONLC3S meetings, as well as the SSG and EMB meetings that are held to essentially prepare/tee up decisions for the CONLC3S to make at their meetings. Also lead review process for any NLCC related documents. – Mobile Objective User System (MUOS) Support: Provided technical and programmatic analysis and insights in support of C3CB oversight of the MUOS risk reduction efforts, Technical Evaluation, Multi-Service OT&E-2 and follow-on development and operational test activities. Supported vendor efforts to develop MUOS capable terminals and get them tested and certified for operation over MUOS, and for Service procurement. Worked closely with industry terminal vendors to ensure their continued IRAD investments to update existing terminals to MUOS WCDMA capability. This C3CB effort strongly supports USD AT&L's BBP 3.0 initiative. Interacted with the MUOS Program Manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Reviewed monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership of MUOS execution status. Participated in the MUOS Configuration Steering Board, Gate 6 review hosted by the Military Deputy, ASN RDA. Provided inputs USD AT&L responses to three Congressional committees' reports on MUOS / terminal synchronization initiatives. - Tracked the successful Navy Multiband Terminal (NMT) procurement. Interacted with the NMT Program Manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Reviewed monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership of NMT execution status. - Cooperative Engagement Capability. Participated in the CEC Configuration Steering Board, Gate 6 review hosted by the Military Deputy, ASN RDA. Orchestrated the CEC Defense Acquisition Executive Summary. Performed follow-up briefings with the CEC Program Manager and DOT&E. Interacted with the CEC Program Manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Reviewed monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership of CEC execution status. - Handheld, Manpack, and Small Form Fit (HMS) JTRS: Assessed the HMS program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conducted independent technical reviews and recommended program performance improvement options to meet cost, schedule and performance objectives. Provided a technical assessment of full and open competition process for both Rifleman and Manpack radios. - Mid-Tier Networking Vehicular Radio (MNVR) JTRS: Assessed the MNVR program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conducted independent technical reviews and recommended program performance			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
improvement options to meet cost, schedule and performance objectives. Provided a technical assessment of full and open competition process for MNVR radios. - All JTRS (HMS, MNVR, AMF, JTN) Programs- Provided assessments of program compliance with IT related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assessed readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provided programmatic recommendations regarding cost/schedule/performance tradeoffs. - Provided assessments of DoD Business System programs with IT related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assessed readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provided programmatic recommendations regarding cost/schedule/performance tradeoffs. - Ground Tactical Networks Advanced Capabilities: Matured narrowband dismounted communications capability with radio hardware prototype, robust modeling and simulation, and reusable software code. Formed industry engagement to promote transition into non-developmental item radios. - Integrated Electromagnetic Spectrum Operations (EMSO): Tracked implementation of iEMSO strategy in radio and EW device development plans. Assessed and down-select technical interoperability and architectural approaches. Ensured adequate funding and testing to assess maturity of solutions. - Tactical Data Link Modernization: Continue TDL improvements to enable U.S. Air Dominance capabilities. Continued to Identify promising Link 16 technology upgrades to match emerging threats. Continued to align prototyping, technology maturation, and receiving program schedules to shorten technology insertion cycles. Performed continued oversight of NEW weapons and develop policy/guidance to manage export control of associated TDL. - Warfighter Information Network – Tactical (WIN-T): Provided analysis of reliability and usability of WIN-T Increment 2 Configuration Items and the Combat Net Radio Extension capability during the Follow-On Test and Evaluation (FOT&E) to support a decision on Full Rate Production. Reviewed and tracked soldier feedback and test results to assess corrections to deficiencies identified during the previous FOT&E. Tracked and monitored the performance of the Inc 3 Network Operations Build 3/4, NetCentric Waveform 10.x and Highband Networking Waveform 3.0 capabilities. - Joint C2 Portfolio Management: Supported development, integration and test activities across the Services, Agencies and Combatant Commands and deliver the FY16-20 version of the Joint C2 Sustainment and Modernization Plan. - C2 Data: Provided technical expertise for ensuring C2 data are visible, accessible, understandable, trustable and interoperable. Provided technical assessment and assistance for implementation of National Information Exchange Model (NIEM)-based information exchanges across the DoD. Updated the C2 Authoritative Data Source roadmap and update C2 data architecture. - Joint C2 Architecture: Provided technical direction and management oversight for the update the Joint C2 Architecture to guide Joint C2 capability area development activities across the Services, Agencies and Combatant Commands. – C2 Analyses: Provided conceptual foundation, metrics and empirical evidence to operationalize Agile C2. Provided technical support to US participation in NATO and other international C2 research efforts.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Friendly Force Tracking/Combat Identification: Provided technical assessment, assistance and recommendations for achieving Mode 5 IFF IOC and FOC. Provided technical support to DoD implementation of Mode 5 including supporting spectrum certification and assignment. – Acquisition Management: Provided technical assistance in developing acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction for specified programs. - Environmental Monitoring: Developed DoD inputs for annual Federal Plan for Meteorological Services and Supporting Research; Supported various Federal and OSD offices on the subjects of: Space Weather, Spectrum losses and weather, Ionospheric capabilities, National Plan for Hurricanes, Space Situational Awareness, and DoD representation for METOC; Updated METOC/ Weather Enterprise Strategy and Roadmap, and oversaw implementation of results of Defense Weather Analysis of Alternatives (AoA); Advised FCB, JCB, and JROC on METOC matters.- Space Control/Space C2/SSA: Performed continued monitoring of cyber testing and cyber vulnerabilities of critical space programs. Supported SSI as OIPT lead for space control programs. - Space Ops: Conducted SATOPS Modernization technical assessments; provided technical Oversight/AFSCN Modernization Implementation; conducted AFSCN Event Driven Net Centric Review/Technical Assessment. - Space Control/Space C2/SSA: Continued the monitoring of cyber testing and cyber vulnerabilities of critical space programs. - Non-Intelligence Space Programs Technical Assessments: Performed cyber vulnerability and cyber suitability assessments on space, PNT, METOC programs and others. Reviewed system design documents, control plans, remote management control ports and methods. Recommend corrective actions to specific space, PNT, and METOC programs to address cyber vulnerabilities and to inform milestone decisions. Conducted non-intelligence space program technical reviews on to include data strategies, systems engineering, risks and mitigations. Supported acquisition milestone decisions for programs including weather satellite follow-on activities. - PNT Programs Technical Assessments: Continued OIPT leadership role. Developed and implemented Annual GPS Enterprise Review to verify readiness of GPS III, MGUE, and OCX programs to progress to next phase of the acquisition process. Ensure synchronization of the three programs to meet the direction of the DAE. Conducted initial deep dive technical analyses to understand all phases of the GPS enterprise programs and predecessor programs that are part of the GPS Enterprise. Reviewed PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. Initiated and conducted studies to expedite fielding and support of M Code capability for forces in the field. - PNT Portfolio Management: Continued the implementation of GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Supported major program milestones and internal OSD reviews such as Strategic Portfolio Reviews, DMAGs, etc.			
FY 2016 Plans: - Common Data Link (CDL) Principal Staff Assistant: Continue to coordinate with CDL Executive Agent to develop and maintain a technology roadmap and terminal database to improve interoperability, configuration management, and focused technology investments. Develop policy to reflect modernization in CDL waveforms and encryption. Continue to oversee development			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
and validation of cryptographic core modernization, Small Unmanned Aircraft System (SUAS) Common Data Link (CDL) terminals, CDL waveform, CDL Compliance Test Tool, and Reference Implementation Laboratory development efforts. Continue development of transition strategy to modernize DoD ISR waveforms to converge on a DoD standard for tactical ISR communications. Update and publish the CDL enterprise roadmap that includes platform schedules and waveform modernization opportunities. Analyze and assess mitigation strategies and technologies with regard to emerging activities that could restrict CDL spectrum access to ensure continued robust ISR communications capabilities. Update Independent Assessment Update of CCM Technology Readiness. Continue planning and conduct of CDL SRP and IPT meetings to develop and refine the CDL investment portfolio and to identify strategic ISR communications issues the DoD will face in the future. Conduct analysis of Airborne ISR communications transport infrastructure in coordination with Joint Staff, Services and Combatant Commands in order to identify a way ahead for establishing an effective/efficient global enterprise capability. - Acquisition Management and Oversight: Provide technical assistance in developing IT related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction. Provide technical assessments and programmatic recommendations across DASD functional areas to address interoperability gaps and work early in the systems engineering. - FAB-T: Analyze readiness for DT&E and OT&E as command post terminal and PNVC production units begin to be delivered and integrated for test. Provide risk assessments of system integration into the various airborne, ground fixed and ground transportable systems prior to installation. Work with Air Force to implement DSD's direction as end-to-end integrator of PNVC capability. - Wideband SATCOM Capability: Execute plans for expansion of SMC's COMSATCOM role. Support Wideband Requirements Review by Joint Staff and prepare for an AoA to determine the way forward after launching remaining WGS satellites, and COMSATCOM as an integrated wideband SATCOM capability. - AEHF: Provide programmatic analysis, technical reviews, and assessments of the AEHF program to reduce development, integration, and procurement risks. Provide risk assessments as the program continues to launch spacecraft and improve the Mission Planning Element, and develop KMI to replace EKMS. - EPS: Provide programmatic analysis, technical reviews, and assessments of the EPS program to reduce development, integration, and procurement risks. Assess risk as the TT&C system is integrated and tested prior to operations. Protected SATCOM AoA: Finalize assessment through analysis and synthesis of performance, cost and resilience data for cross-domain alternatives to support Protected SATCOMs (including infrastructure to support NC3 requirements). Document analysis of alternatives in Final Report to provide recommendations for technology investments and associate acquisition strategy for Protected SATCOM capability. - National Leadership Command Capability (NLCC): Continue in lead role as primary action office for AT&L in his role as co-chair of the Council on Oversight of the National Leadership Command, Control, and Communications System (CONLC3S). Work directly with the Executive Secretariat (DOD CIO) to oversee all aspects of preparation and conduct of CONLC3S meetings, as well as the SSG and EMB meetings that are held to essentially prepare/tee up decisions for the CONLC3S to make at			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
their meetings. Also lead review process for any NLCC related documents. Supports the Joint Staff led Nuclear C2 CBA to its completion and identify capability gaps to be addressed by the CONLC3S. – Mobile User Objective System (MUOS): Provide technical and programmatic analysis and insights in support of C3CB oversight of the completion of the MUOS Multi-Service OT&E-2 and follow-on development and operational test activities. Continue to support vendor efforts to develop MUOS capable terminals and get them tested and certified for operation over MUOS, and for Service procurement. Prepare program documentation including ADM for follow-on sustainment activities for MUOS. Continue to track MUOS contract and management performance through interaction with the MUOS Program Manager, ASN RDA staff, and the Defense Contract Management Agency. Continue interaction with the Combatant Commanders and the Army Forces Strategic Command in support of Early Operational Acceptance and Full Operational Acceptance. - Navy Multiband Terminal. Continue to track progress toward completion of NMT deliverables. Interact with the NMT program manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Review monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership should any issues arise with NMT execution status. - Cooperative Engagement Capability. Participate in the CEC Configuration Steering Board, Gate 6 review hosted by the Military Deputy, ASN RDA. Performed follow-up briefings with the CEC Program Manager and DOT&E. Interact with the CEC Program Manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Reviewed monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership of CEC execution status especially with regard to the Common Array Block antenna. - Handheld, Manpack, and Small Form Fit (HMS) JTRS: Assess the HMS program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conduct independent technical reviews and recommend program performance improvement options to meet cost, schedule and performance objectives. Provide a technical assessment of full and open competition process for both Rifleman and Manpack radios. Provide technical and programmatic analysis to support the Defense Acquisition Executive' Full Rate Production decision review. Assess the results of Initial Operational Test and Evaluation (IOT&E) as well as the existing manufacturing process, performance and reliability, and sustainment capabilities to formulate a recommendation for Full-Rate Production. - Joint Tactical Networking Center (JTNC) JTRS: Provide technical and programmatic analysis to support the Defense Acquisition Executive's role as the co-chair of the JTNC Board of Directors (BoD). Provide Secretariat functions for the JTNC BoD. - All JTRS (HMS, MNVR, AMF, JTN) Programs - Provide assessments of program compliance with IT related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assess readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provide programmatic recommendations regarding cost/schedule/performance tradeoffs. - Mid-Tier Networking Vehicular Radio (MNVR) JTRS: Assess the AMNVR program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conduct independent technical reviews and recommend program performance improvement options to meet cost, schedule and performance objectives. Provide a technical assessment of full and open competition process for MNVR radios.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Provide assessments of DoD Business System programs with related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assess readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provide programmatic recommendations regarding cost/schedule/ performance tradeoffs. - Ground Tactical Networks Advanced Capabilities: Mature narrowband dismounted communications capability with radio hardware prototype, robust modeling and simulation, and reusable software code. Form industry engagement to promote transition into non-developmental item radios. - Integrated Electromagnetic Spectrum Operations (EMSO): Track implementation of iEMSO strategy in radio and EW device development plans. Assess and down-select technical interoperability and architectural approaches. Ensure adequate funding and testing to assess maturity of solutions. Develop science and technology roadmap to synchronize transition of key technologies to programs of record for spectrum-dependent systems. FY16 work will focus will focus on selected sensor and electronic warfare systems and continue work on communications systems. - Tactical Data Link Modernization: Accelerate improvements in TDLs to address A2AD and contested operations. Build case for an Executive Agent (EA) for Airborne Tactical Data Networking to bring cross-Service high level focus to TDL improvements and coordinated S&T investments for future capabilities. Structure Link 16 evolution plans. Work with F-35 program to baseline Multi-function Advanced Data Link (MADL) and develop open architecture implementation of MADL waveform. Develop initial concepts for common open architecture TDL terminal for potential use on next generation aircraft and F-35 block upgrades. Strengthen acquisition oversight, system engineering, standards and interoperability in use of TDLs on Network Enabled Weapons (NEW). - Warfighter Information Network – Tactical (WIN-T): Provide assessment of the transition of Increment 3 Network Operations and Net Centric Waveform software enhancements into the Increment 2 hardware units for fielding. Provide final assessment of the Highband Networking Waveform 3.0 capability and track its progress for entry into the Waveform Repository. - Joint C2 Portfolio Management: Support development, integration and test activities across the Services, Agencies and Combatant Commands and deliver the FY17-21 version of the Joint C2 Sustainment and Modernization Plan. - C2 Data: Provide technical expertise for ensuring C2 data are visible, accessible, understandable, trustable and interoperable. Provide technical assessment and assistance for implementation of National Information Exchange Model (NIEM)-based information exchanges across the DoD. Update the C2 Authoritative Data Source roadmap and update C2 data architecture. - Joint C2 Architecture: Provide technical expertise for the update the Joint C2 Architecture to guide Joint C2 capability area development activities across the Services, Agencies and Combatant Commands. - Friendly Force Tracking/ Combat Identification: Provide technical assessment, assistance and recommendations for achieving Mode 5 IFF IOC and FOC. Provide technical support to DoD implementation of Mode 5 including supporting spectrum certification and assignment. – Acquisition Management: Provide technical assistance in developing related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Environmental Monitoring: Develop DoD inputs for annual Federal Plan for Meteorological Services and Supporting Research; Support to various Federal and OSD offices on the subjects of: Space Weather, Spectrum losses and weather, Ionospheric capabilities, National Plan for Hurricanes, Space Situational Awareness, and DoD representation for METOC; Update as required METOC/Weather Enterprise Strategy and Roadmap and oversee implementation of results of Defense Weather Analysis of Alternatives (AoA); conduct assessment of USG weather satellite common ground system compliance; implement METOC data strategy; implement DoD National Space Weather Strategy; advise Defense Space Acquisition Board, FCB/JROC/JCIDS process, other OSD PSAs, EA for Space office, COIs, etc. on METOC matters. - Space Ops: Conduct SATOPS Modernization technical assessments; provide technical Oversight/AFSCN Modernization Implementation; conduct AFSCN Event Driven Net Centric Review/Technical Assessment. - Space Control/Space C2/SSA: Perform continued monitoring of cyber testing and cyber vulnerabilities of critical space programs. - Non-Intelligence Space Programs Technical Assessments: Perform cyber vulnerability and cyber suitability assessments on space, PNT, METOC programs and others. Review system design documents, control plans, remote management control ports and methods. Recommend corrective actions to specific space, PNT, and METOC programs to address cyber vulnerabilities and to inform milestone decisions. Conduct non-intelligence space program technical reviews on to include data strategies, systems engineering, risks and mitigations. Support acquisition milestone decisions for programs including weather satellite follow-on activities. - PNT Programs Technical Assessments: Continue OIPT leadership role. Develop and implement Annual GPS Enterprise Review to verify readiness of GPS III, MGUE, and OCX programs to progress to next phase of the acquisition process. Ensure synchronization of the three programs to meet the direction of the DAE. Conduct deep dive technical analyses to understand all phases of the GPS enterprise programs and predecessor programs that are part of the GPS Enterprise. Review PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. Initiate and conduct studies to expedite fielding and support of M Code capability for forces in the field. - PNT Portfolio Management: Continue implementation of GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Continue to support major program milestones and internal OSD reviews such as Strategic Portfolio Reviews, DMAGs, etc.			
FY 2017 Plans: - Common Data Link (CDL) Principal Staff Assistant: Continue to coordinate with CDL Executive Agent to develop and maintain a technology roadmap and terminal database to improve interoperability, configuration management, and focused technology investments. Continue implementation and oversight of an enterprise transition strategy to modernize DoD ISR waveforms to converge on a DoD standard for tactical ISR communications. Update CDL technology development roadmap to reflect current trends in technology that can add enhanced capabilities to CDL systems. Continue planning and conduct of CDL SRP and IPT meetings to develop and refine the CDL investment portfolio and to identify strategic ISR communications issues the DoD will face			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
in the future. Conduct analysis of Airborne ISR communications transport infrastructure in coordination with Joint Staff, Services and Combatant Commands in order to identify a way ahead for establishing an effective/efficient global enterprise capability. - Acquisition Management and Oversight: Provide technical assistance in developing IT related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction. Provide technical assessments and programmatic recommendations across DASD functional areas to address interoperability gaps and work early in the systems engineering. - FAB-T: Support IOT&E execution. Work to assure the program has a successful LRIP-2 decision. Continue to support PNVC integration and test. Provide risk assessments of system integration into the various airborne, ground fixed an ground transportable systems prior to installation. - Wideband SATCOM AoA: Develop AoA plan assessing material solutions for WGS replenishment and for supporting other traditional commercial supplied users considering life-cycle cost, performance, suitability, operational effectiveness, and resiliency. Support implementation and execution of the AoA plan including Senior Advisory Group meetings and evaluation of the space and control segments with associated user terminals for contested and benign operating environments. - AEHF: Provide programmatic analysis, technical reviews, and assessments of the AEHF program to reduce development, integration, and procurement risks. Provide risk assessments as the program continues to launch spacecraft and improve the Mission Planning Element. Work to start efforts for the follow-on system to AEHF. - EPS: Provide programmatic analysis, technical reviews, and assessments of the EPS program to reduce development, integration, and procurement risks. Assess risk as the TT&C system is integrated and tested prior to operations. Work to start efforts for the follow-on system to EPS. - National Leadership Command Capability (NLCC): Continue in lead role as primary action office for AT&L in his role as co-chair of the Council on Oversight of the National Leadership Command, Control, and Communications System (CONLC3S). Work directly with the Executive Secretariat (DOD CIO) to oversee all aspects of preparation and conduct of CONLC3S meetings, as well as the SSG and EMP meetings that are held to essentially prepare/tee up decisions for the CONLC3S to make at their meetings. Also lead review process for any NLCC related documents. – Mobile User Objective System (MUOS) S: Provide technical and programmatic analysis and insights in support of C3CB oversight of the MUOS program. Continue to support vendor efforts to develop MUOS capable terminals and get them tested and certified for operation over MUOS, and for Service procurement. Prepare program documentation including ADM for follow-on sustainment activities for MUOS. Continue to track MUOS contract and management performance through interaction with the MUOS Program Manager, ASN RDA staff, and the Defense Contract Management Agency. Continue interaction with the Combatant Commanders and the Army Forces Strategic Command in support of operational fielding. Support C3CB contribution to the narrowband requirements review. Provide C3CB with technical expertise to the preliminary activities that will support co-lead of the narrowband AoA which is anticipated to start in FY 18 or FY19.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Navy Multiband Terminal. Continue to track progress toward completion of NMT deliverables. Interact with the NMT program manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Review monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership should any issues arise with NMT execution status. - Cooperative Engagement Capability. Participate in the CEC Configuration Steering Board, Gate 6 review hosted by the Military Deputy, ASN RDA. Performed follow-up briefings with the CEC Program Manager and DOT&E. Interact with the CEC Program Manager, ASN RDA staff and the Defense Contract Management Agency (DCMA). Reviewed monthly DCMA Performance Assessment Reports (PARs) advising C3CB leadership of CEC execution status especially with regard to the Common Array Block antenna. - Handheld, Manpack, and Small Form Fit (HMS) JTRS: Assess the HMS program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conduct independent technical reviews and recommend program performance improvement options to meet cost, schedule and performance objectives. Provide a technical assessment of full and open competition process for both Rifleman and Manpack radios. Provide technical and programmatic analysis to support the Defense Acquisition Executive' Full Rate Production decision review. Assess the results of Initial Operational Test and Evaluation (IOT&E) as well as the existing manufacturing process, performance and reliability, and sustainment capabilities to formulate a recommendation for Full-Rate Production. - Joint Tactical Networking Center (JTNC) JTRS: Provide technical and programmatic analysis to support the Defense Acquisition Executive's role as the co-chair of the JTNC Board of Directors (BoD). Provide Secretariat functions for the JTNC BoD. - All JTRS(HMS, MNVR, AMF, JTN)Programs - Provide assessments of program compliance with IT related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assess readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provide programmatic recommendations regarding cost/schedule/performance tradeoffs. - Mid-Tier Networking Vehicular Radio (MNVR) JTRS: Assess the AMNVR program to include the risk of vendor selected radios (Modified Non-Developmental Item). Conduct independent technical reviews and recommend program performance improvement options to meet cost, schedule and performance objectives. Provide a technical assessment of full and open competition process for MNVR radios. - Provide assessments of DoD Business System programs with related acquisition policy, in accordance with DoD Series 5000 and applicable senior management direction. Assess readiness for major acquisition program milestone reviews, to include adequate documentation of compliance with statute/regulation/policy associated with acquisition program oversight. Provide programmatic recommendations regarding cost/schedule/ performance tradeoffs. - Ground Tactical Networks Advanced Capabilities: Mature narrowband dismounted communications capability with radio hardware prototype, robust modeling and simulation, and reusable software code. Form industry engagement to promote transition into non-developmental item radios. - Integrated Electromagnetic Spectrum Operations (EMSO): Track implementation of iEMSO strategy in radio and EW device development plans. Assess and down-select technical interoperability and architectural approaches. Ensure adequate			

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Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
funding and testing to assess maturity of solutions. Develop science and technology roadmap to synchronize transition of key technologies to programs of record for spectrum-dependent systems. FY17 work will focus will focus on selected sensor and electronic warfare systems and continue work on communications systems. - Tactical Data Link Modernization: Track and assess first Link 16 capability improvements in Multi-function Information Distribution System (MIDS-J) terminals (4th Gen aircraft), Communications, Navigation & Identification (CNI) terminal in F-35, and Weapons Data Link (WDL) radios. Begin standup of EA for Airborne Tactical Data Networking and develop detailed roadmaps and modernization strategies. Assess preliminary requirements for MADL 2.0 version and applicability to next generation aircraft needs. Assess modeling and simulation infrastructure and currency with adversary threat emitters to improve investments decisions on TDL improvements. - Warfighter Information Network – Tactical (WIN-T): Review and assess the results of the Highband Networking Waveform (HNW) 3.0 air and ground node demonstration. Track progress of the HNW 3.0 entry into the Waveform Repository. Provide a technical review of the Increment 2 independent cyber design and implementation assessment. Provide technical reviews and assessments of Increment 2 performance and corrective actions to include platform integration issues, Network Operations Tools improvements, and performance optimization of the HNW, Tactical Relay Tower, and Range Throughput Extension Kit. - Joint C2 Portfolio Management: Support development, integration and test activities across the Services, Agencies and Combatant Commands and deliver the FY17-21 version of the Joint C2 Sustainment and Modernization Plan. - C2 Data: Provide technical expertise for ensuring C2 data are visible, accessible, understandable, trustable and interoperable. Provide technical assessment and assistance for implementation of National Information Exchange Model (NIEM)-based information exchanges across the DoD. Update the C2 Authoritative Data Source roadmap and update C2 data architecture. - Joint C2 Architecture: Provide technical expertise for the update the Joint C2 Architecture to guide Joint C2 capability area development activities across the Services, Agencies and Combatant Commands. - Friendly Force Tracking/ Combat Identification: Provide technical assessment, assistance and recommendations for achieving Mode 5 IFF IOC and FOC. Provide technical support to DoD implementation of Mode 5 including supporting spectrum certification and assignment. – Acquisition Management: Provide technical assistance in developing related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statue, regulation and management direction. - Environmental Monitoring: Develop DoD inputs for annual Federal Plan for Meteorological Services and Supporting Research; Support to various Federal and OSD offices on the subjects of: Space Weather, Spectrum losses and weather, Ionospheric capabilities, National Plan for Hurricanes, Space Situational Awareness, and DoD representation for METOC; Update as required METOC/Weather Enterprise Strategy and Roadmap and oversee implementation of results of Defense Weather Analysis of Alternatives (AoA); conduct assessment of USG weather satellite common ground system compliance; implement METOC data strategy; implement DoD National Space Weather Strategy; Advise Defense Space Acquisition Board, FCB/JROC/JCIDS process, other OSD PSAs, EA for Space office, COIs, etc. on METOC matters.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Space Ops: Conduct SATOPS Modernization technical assessments; provide technical Oversight/AFSCN Modernization Implementation; conduct AFSCN Event Driven Net Centric Review/Technical Assessment. - Space Control/Space C2/SSA: Perform continued monitoring of cyber testing and cyber vulnerabilities of critical space programs. - Non-Intelligence Space Programs Technical Assessments: Perform cyber vulnerability and cyber suitability assessments on space, PNT, METOC programs and others. Review system design documents, control plans, remote management control ports and methods. Recommend corrective actions to specific space, PNT, and METOC programs to address cyber vulnerabilities and to inform milestone decisions. Conduct non-intelligence space program technical reviews on to include data strategies, systems engineering, risks and mitigations. Support acquisition milestone decisions for programs including weather satellite follow-on activities. - PNT Programs Technical Assessments: Continue OIPT leadership role. Develop and implement Annual GPS Enterprise Review to verify readiness of GPS III, MGUE, and OCX programs to progress to next phase of the acquisition process. Ensure synchronization of the three programs to meet the direction of the DAE. Conduct deep dive technical analyses to understand all phases of the GPS enterprise programs and predecessor programs that are part of the GPS Enterprise. Review PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. Initiate and conduct studies to expedite fielding and support of M Code capability for forces in the field. - PNT Portfolio Management: Continue implementation of GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Continue to support major program milestones and internal OSD reviews such as Strategic Portfolio Reviews, DMAGs, etc.			
Accomplishments/Planned Programs Subtotals	19.556	10.332	11.793

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

In executing JTDL tasking, existing fixed-price and cost-plus contracts will be utilized.

- Program reviews in support of the JCIDS, acquisition and PPBE processes.

E. Performance Metrics

Enterprise-Wide Alignment: Accelerate DoD information age transformation to increase the effectiveness and efficiency of the warfighting, intelligence and business missions.

Measures:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

- Timely development and issuance of policy and guidance
- Instantiation of enterprise-wide system engineering for the Joint Information Environment (JIE)

Portfolio Management: Provide for the timely and effective delivery of key Net-Centric capabilities through portfolio management of associated technology development and Major Defense Acquisition Programs (MDAPS) and Major Automated Information Systems (MAIS).
Measures:
- Key milestones completed for major net-centric acquisitions
- Number of major systems successfully completing net-centric critical performance reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	Project (Number/Name) 771 / *Link-16 Tactical Data Link (TDL) Transformation*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Link-16 Tactical Data Link (TDL) Transformation	C/TBD	OUSD(AT&L)/ OASD(A)/ DASD(C3CB) : Pentagon	52.049	19.556		10.332		11.793		-		11.793	-	-	-
		Subtotal	52.049	19.556		10.332		11.793		-		11.793	-	-	-

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.049	19.556		10.332		11.793		-		11.793	-	-	-

Remarks

Resources will be used to provide technical, systems engineering and acquisition management oversight of programs, projects and activities to maximize the Department's return on investment in information technology resources and to affect a comprehensive approach for assessing and procuring critical information systems from initial design, through development to capability delivery in support of improved weapons systems performance and military operations.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

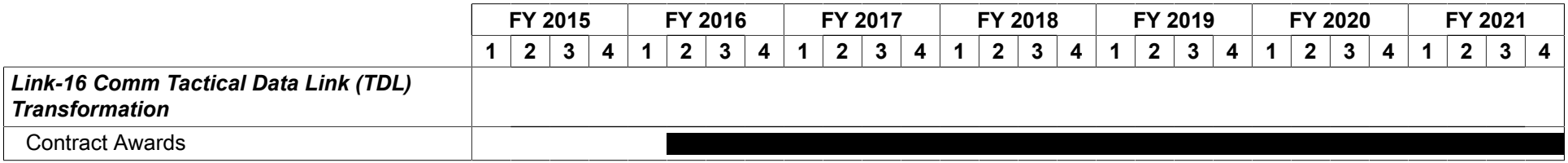

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 771 / *Link-16 Tactical Data Link (TDL) Transformation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Link-16 Comm Tactical Data Link (TDL) Transformation				
Contract Awards	2	2016	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	Project (Number/Name) 105 / *Cyber Capability & Platform Resilience*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
105: *Cyber Capability & Platform Resilience*	-	0.000	3.925	4.495	-	4.495	4.100	4.000	4.000	4.100	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provides resources for developmental acquisition support and management (to include the Cyber Investment and Management Board (CIMB)) oversight of Cyber capabilities as the Department conceives, develops, and rapidly fields cyber capabilities for Cyberspace Operations and the instantiation of cyber resilient platforms and weapons systems for priority kinetic and non-kinetic missions. The CIMB was established in 2012 in response to the FY2011 NDAA Section 933, where DoD was directed to provide a "strategy for the rapid acquisition of cyber capabilities, for cyber warfare for USCC and the Cyber Service components of the military departments. USD(AT&L) is responsible for compliance with the FY2011 NDAA and Chairs the CIMB.

Funds provide technical, systems engineering, trend analysis, and oversight of programs, projects and activities developing cyber capabilities to maximize the Department's return on investment of cyberspace resources and effect a comprehensive approach for assessing, procuring, and sustaining critical cyber capabilities and cyber resilient systems and platforms from initial design, through development to capability delivery in support of weapons systems performance and military operations. Additionally, these funds will provide systems analyses, portfolio management, executive support of CIMB, enterprise wide systems engineering and operational impact analyses related to Cyber capabilities and ensuring cyber resilience within systems and platforms. Resources will also be used to provide expertise required for exercising technical direction over design, performance, cost parameters, determining and mitigating cyber risks of key systems and their dependencies. The goal of this funding is to assure capability advantage, reduce time to the field, evaluate projects and concepts, minimize cyber related performance and operational risk of developing and fielding complex systems, ensure program dependencies are documented and included in acquisition decisions and address cyber security requirements, gaps and required technical solutions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Cyber Capability and Platform Resilience	-	3.925	4.495
Description: Provides resources for developmental acquisition support and management (to include the Cyber Investment and Management Board (CIMB)) oversight of Cyber capabilities as the Department conceives, develops, and rapidly fields cyber capabilities for Cyberspace Operations and the instantiation of cyber resilient platforms and weapons systems for priority kinetic and non-kinetic missions. The CIMB was established in 2012 in response to the FY2011 NDAA Section 933, where DoD was directed to provide a "strategy for the rapid acquisition of cyber capabilities, for cyber warfare for USCC and the Cyber Service components of the military departments. USD(AT&L) is responsible for compliance with the FY2011 NDAA and Chairs the CIMB. Funds provide technical, systems engineering, trend analysis, and oversight of programs, projects and activities developing cyber capabilities to maximize the Department's return on investment of cyberspace resources and effect a comprehensive approach for assessing, procuring, and sustaining critical cyber capabilities and cyber resilient systems and platforms from initial design, through development to capability delivery in support of weapons systems performance and military			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 105 / *Cyber Capability & Platform Resilience*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
operations. Additionally, these funds will provide systems analyses, portfolio management, executive support of CIMB, enterprise wide systems engineering and operational impact analyses related to Cyber capabilities and ensuring cyber resilience within systems and platforms. Resources will also be used to provide expertise required for exercising technical direction over design, performance, cost parameters, determining and mitigating cyber risks of key systems and their dependencies. The goal of this funding is to assure capability advantage, reduce time to the field, evaluate projects and concepts, minimize cyber related performance and operational risk of developing and fielding complex systems, ensure program dependencies are documented and included in acquisition decisions and address cyber security requirements, gaps and required technical solutions. ***FY 2016 Plans:*** - Cyber Investment Management: Synchronize and coordinate cyberspace acquisition activities, conduct quantitative assessments, and ensure cyberspace investments align with Department priorities, required capabilities and evolving cyber threats. Provide support of the Cyber Investment Management Board and develop implementation guidance and associated direction. Continue to plan and conduct CIMB/CCT meetings to refine the cyber investment portfolio and to identify strategic cyber issues the DoD will face in the future. - Refine the Cyber investment portfolio results, ensuring return on investment and risk ultimately leading to an optimization phase focusing on process improvement is included. - Conduct investment analysis of the DoD-wide Cyber Special Access Program (SAP) portfolio to include return on investment and risk analysis. - Utilize the results of the Cyber Rapid Acquisition Process Pilots to implement the new rapid cyber acquisition processes across DoD, ensuring DoD Acquisition Policy is updated to reflect processes. - Manage Cyber security Guidebook for Program Managers. Contribute to any follow on efforts to revise policy or guidance regarding Cyber security within the Acquisition process. - Continue oversight of implementation of the Cyber Situational Awareness EoA (phase I and II) recommendations. - Initiate capability development of recommendations of the Unified Platform AoA. - Continue oversight of Joint Cyber Command and Control (C2) capability development. - Ensure Platform Resilience/Mission Assurance (PR/MA); Oversee implementation of the recommendations on Cyber vulnerabilities of Department of Defense weapon systems and tactical communications systems. - Continue to synchronize and provide oversight for DoD Cyber Ranges that support Cyber Training and Testing & Evaluations through the Cyber Range Focal Point. - Implement DoD Cyber Range strategy, working with T&E and DOT&E and JS. - Conduct technical analysis to determine tools necessary to help collect, measure, assess DCO/OCO effectiveness and suitability in a Cyber Range Environment.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 105 / *Cyber Capability & Platform Resilience*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Oversee DoD efforts to equip the cyber mission force. Support developments of requirements documents and architectures as required in collaboration with USCYBERCOM. ***FY 2017 Plans:*** Cyber Investment Management: Synchronize and coordinate cyberspace acquisition activities, conduct quantitative assessments, and ensure cyberspace investments align with Department priorities, required capabilities and evolving cyber threats. Provide support of the Cyber Investment Management Board and develop implementation guidance and associated direction. Continue to plan and conduct CIMB/CCT meetings to refine the cyber investment portfolio and to identify strategic cyber issues the DoD will face in the future. - Refine the Cyber investment portfolio results, ensuring return on investment and risk ultimately leading to an optimization phase focusing on process improvement is included. - Conduct investment analysis of the DoD-wide Cyber Special Access Program (SAP) portfolio to include return on investment and risk analysis. - Utilize the results of the Cyber Rapid Acquisition Process Pilots to implement the new rapid cyber acquisition processes across DoD, ensuring DoD Acquisition Policy is updated to reflect processes. - Manage Cyber security Guidebook for Program Managers. Contribute to any follow on efforts to revise policy or guidance regarding Cyber security within the Acquisition process. - Continue oversight of implementation of the Cyber Situational Awareness EoA (phase I and II) recommendations. - Initiate capability development of recommendations of the Unified Platform AoA. - Continue oversight of Joint Cyber Command and Control (C2) capability development. - Ensure Platform Resilience/Mission Assurance (PR/MA); Oversee implementation of the recommendations on Cyber vulnerabilities of Department of Defense weapon systems and tactical communications systems. - Continue to synchronize and provide oversight for DoD Cyber Ranges that support Cyber Training and Testing & Evaluations through the Cyber Range Focal Point. - Implement DoD Cyber Range strategy, working with T&E and DOT&E and JS. - Conduct technical analysis to determine tools necessary to help collect, measure, assess DCO/OCO effectiveness and suitability in a Cyber Range Environment. - Oversee DoD efforts to equip the cyber mission force. Support developments of requirements documents and architectures as required in collaboration with USCYBERCOM.			
Accomplishments/Planned Programs Subtotals	-	3.925	4.495

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 105 / *Cyber Capability & Platform Resilience*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Existing firm fixed priced and cost plus contracts will be utilized.

E. Performance Metrics

Enterprise-Wide Cyber Investments: instantiation of cyber capabilities for resilient systems include risk assessments, vulnerability assessments, mitigation plans, prototype architectures, investment strategies, trends analyses, Evaluation/Analysis of Alternatives, integrated mission analyses, technical and policy guidance directives.

Measures:
- Timely development and issuance of policy and guidance
- Timely delivery and development of key investment strategies, trend analysis and outcomes of the Evaluation/Analysis of Alternatives.

Portfolio Management: Provide for the timely and effective delivery of portfolio management support of associated with Cyber Security and Major Defense Acquisition Programs (MDAPS) and Major Automated Information Systems (MAIS).
Measures:
- Key milestones completed for major cyber related acquisitions

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	Project (Number/Name) 105 / *Cyber Capability & Platform Resilience*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cyber Capability and Platform Resilience	C/TBD	OUSD(AT&L)/ OASD(A)/ DASD(C3CB) : Pentagon	-	-		3.925		4.495		-		4.495	-	-	-
		Subtotal	-	-		3.925		4.495		-		4.495	-	-	-

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.925		4.495		-		4.495	-	-	-

Remarks

Funds provide technical, systems engineering, trend analysis, and oversight of programs, projects and activities developing cyber capabilities to maximize the Department's return on investment of cyberspace resources and effect a comprehensive approach for assessing, procuring, and sustaining critical cyber capabilities and cyber resilient systems and platforms from initial design, through development to capability delivery in support of weapons systems performance and military operations. Additionally, these funds will provide systems analyses, portfolio management, executive support of CIMB, enterprise wide systems engineering and operational impact analyses related to Cyber capabilities and ensuring cyber resilience within systems and platforms.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 105 / *Cyber Capability & Platform Resilience*

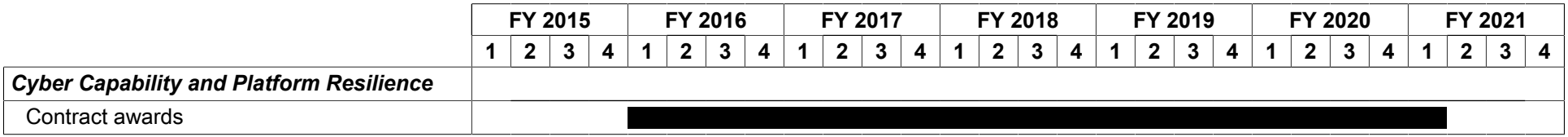

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0604771D8Z / *Joint Tactical Information Distribution System (JTIDS)*	**Project (Number/Name)** 105 / *Cyber Capability & Platform Resilience*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Capability and Platform Resilience				
Contract awards	1	2016	1	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	7.210	3.150	3.267	2.920	-	2.920	3.445	3.245	3.131	3.192	Continuing	Continuing
P013: *Defense Exportability Features (DEF) Program*	7.210	3.150	3.267	2.920	-	2.920	3.445	3.245	3.131	3.192	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Exportability Features (DEF) Pilot Program is a result of a USD(AT&L) sponsored legislative proposal for authorities to better prepare warfighting systems for non-US use. This program funds activities to support identification of major defense acquisition programs for possible export, and the planning for design and incorporation of exportability features during research and development of these programs. Features include, but are not limited to, technology and engineering design activity such as capability differentials, anti-tamper, system assurance, and software assurance. Activities include the development of program protection strategies for the program; the design and incorporation of exportability features into the system; implementation of exportability requirements onto contracts; and research, development, test, and evaluation activities.

Defense exportability features play a critically important role in United States Government/DoD efforts to build partnership capacity. Funds support building joint and coalition environments by enabling the export of DoD systems to a wide range of partner nations, resulting in improved security and interoperability. In addition to the operational benefits, by providing these resources up front, then collecting 'fair share' non-recurring cost recoupment, the United States and partner nations will save significant resources by more efficiently designing and producing exportable U.S. systems.

Funding was decreased in FY 2017 to account for availability of prior year execution balances and as part of internal realignment of funds to other programs to achieve efficiencies. A number of designated systems participating in the DEF Pilot Program in FY17 will continue defining and implementing DEF 'best practices' related to designing and developing technology protection in the areas of program management, system engineering, and technology protection measures in the DoD acquisition process. Failure to consider export variant designs early in the acquisition process results in increased costs, delayed delivery, and higher risk of sensitive technology compromise due to ad-hoc sales later in production. Early development of export variants, including systems design approaches to integrate adequate domestic and exportable anti-tamper (AT) protection and differential capability (DC) requirements to lower production costs, makes it possible to improve quality and timely deliveries to allies and friends, and may enhance US industry share of the global marketplace.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	3.238	3.273	3.360	-	3.360
Current President's Budget	3.150	3.267	2.920	-	2.920
Total Adjustments	-0.088	-0.006	-0.440	-	-0.440
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-0.006			
• SBIR/STTR Transfer	-0.087	-			
• Fiscal Guidance	-	-	-0.392	-	-0.392
• Efficiency Redux	-	-	-0.048	-	-0.048

Change Summary Explanation

The FY 2017 funding request was reduced by $0.392M to account for the availability of prior year execution balances. The program was reduced an additional $0.048M as part of an internal realignment of funds to other programs to achieve efficiencies.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / *Defense Exportability Program*	Project (Number/Name) P013 / *Defense Exportability Features (DEF) Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P013: *Defense Exportability Features (DEF) Program*	7.210	3.150	3.267	2.920	-	2.920	3.445	3.245	3.131	3.192	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Exportability Features (DEF) Pilot Program was a result of a USD(AT&L) sponsored legislative proposal that was authorized in the FY 2011 NDAA for authorities to better prepare warfighting systems for non-US use. This program funds activities to support identification of major defense acquisition programs for possible export, and the planning for design and incorporation of exportability features during research and development of these programs. Features include, but are not limited to, technology and engineering design activity such as capability differentials, anti-tamper, system assurance, and software assurance. Activities include the development of technology protection strategies for the program; the design and incorporation of exportability features into the system; implementation of exportability requirements onto contracts; and research, development, test, and evaluation activities.

Defense exportability features play a critically important role in United States Government/DoD efforts to build partnership capacity. Funds support building joint and coalition environments by enabling the export of DoD systems to a wide range of partner nations, resulting in improved security and interoperability. In addition to the operational benefits, by providing these resources up front, then collecting 'fair share' non-recurring cost recoupment, the United States and partner nations may save significant resources by more efficiently designing and producing exportable U.S. systems. Incorporation of defense exportability features in initial designs also has the potential to help control costs throughout the product life cycle.

Funding in FY 2017 supports systems selected to participate in the Defense Exportability Features Pilot Program that are defining and implementing DEF 'best practice' program management, system engineering, and technology protection measures in the DoD acquisition process. Failure to consider export variant designs early in the acquisition process results in increased costs, delayed delivery, and higher risk of sensitive technology compromise due to ad-hoc sales late in production. Early development of export variants, including systems design approaches to integrate adequate domestic and exportable anti-tamper (AT) protection and differential capability (DC) requirements to lower production costs, increases quality and timely deliveries to allies and friends, and enhances US industry share of the global marketplace.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Exportability Features (DEF) Program	3.150	3.267	2.920
FY 2015 Accomplishments: - Funding was decreased in FY 2015 as Military Departments concentrated on follow-on DEF studies of select DEF programs, from feasibility studies to design analysis. Initiated or continued contracts for DEF feasibility studies on the following previously selected systems:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Integrated Air and Missile Defense (US Army) - P-8A Poseidon Multi-Mission Maritime Aircraft (US Navy) - Small Diameter Bomb II (US Air Force) - MQ-4C Triton formerly Broad Area Maritime Surveillance (US Navy) - Common Joint Proximity Height of Burst Fusing (US Army) - Reviewed major defense acquisition programs for exportability as part of the major milestone review process. - Identified new pilot candidates from Service Acquisition Executive nominations. - Identified Service leads and subject matter experts, to provide support to programs prior to Milestone B, to develop plans for exportability features. - Managed and tracked the completion of the contractor exportability feasibility studies and design activities. - Completed and published a USD(AT&L) signed OSD DEF Pilot Program Policy Implementation Memorandum and Guidelines. - Oversaw drafting of DEF Lessons Learned from MQ-9, JASSM, and P-8A programs, and Interim Progress Review briefings from P-8A, SDB II, HOBF, and MQ-4C, and Final Reports from IAMD, P-8A, and MQ-4C studies completed in FY15. - Drafted and submitted the annual report to Congress on the DEF Pilot Program. The focus for FY 2015 for the DEF pilot program was to execute feasibility studies from selected DEF Pilot Programs that have yet to receive DEF funding, and to conduct follow-on DEF design studies on designated DEF pilot programs. As with the FY 2014 programs, FY 2015 feasibility studies further defined the required actions for incorporating DEF into programs, beginning DEF designs on select designated programs, and assessing the potential costs of those actions. OUSD (AT&L) continued to engage with program offices through the Military Department DEF POCs, and served as a liaison among the program offices, the Military Departments, and other Technology Security and Foreign Disclosure offices to facilitate the feasibility studies. For pre-MS A and B systems, OUSD(AT&L)/IC ensured the DEF feasibility studies were addressed in their program Acquisition Strategies and Program Protection Plans (PPP). For Post-MS B platforms, when there was already a contract in place, OUSD (AT&L) worked with the program managers and contracting officers to implement the necessary contractual modifications to ensure that the feasibility studies were executed. ***FY 2016 Plans:*** - Funding was slightly increased in FY 2016 to expand the number of systems included in the Defense Exportability Features Pilot Program that are used to define and implement DEF 'best practice' program management, system engineering, and technology protection measures in the DoD acquisition process, and to cover more expensive follow-on DEF export design activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
In FY16, the DEF Pilot Program is initiating or continuing contracts for DEF feasibility studies or DEF design activities on the following previously selected systems (plus any new DEF Pilot Program designated systems selected by OSD for FY 2016 - 2017): - Small Diameter Bomb II (US Air Force) - Three-Dimensional Expeditionary Long-Range Radar (US Air Force) - Common Joint Proximity Height of Burst Fusing (US Army) - Joint Air to Ground Missile (US Army) - Indirect Fires Protection Capability (US Army) - Integrated Air and Missile Defense (US Army) - Miniature Air Launched Decoy (US Air Force) - Review of major defense acquisition programs for exportability as part of the major milestone review process. - Identify and select new pilot program candidates from Service Acquisition Executive nominations. - Identify Service leads and subject matter experts, to provide support to programs, prior to Milestone B, to develop plans for exportability features. - Manage, fund, and track the completion of the contractor exportability feasibility studies and design activities. - Oversee drafting of DEF Lessons Learned and Interim Progress Reviews and Final Reports from DEF studies conducted in FY 2016. - Draft and submit the annual report to Congress on the program. The focus for FY 2016 for the DEF pilot program will be to execute initial or follow-on feasibility studies for selected DEF Pilot Programs, and to conduct initial or follow-on DEF design studies on designated DEF pilot programs. As with the FY 2015 programs, FY 2016 feasibility studies will define the required actions for incorporating DEF into programs, begin DEF designs on select designated programs, and assess the potential costs of those actions. OUSD (AT&L) will continue to engage with program offices through the Military Department DEF POCs, and serve as a liaison among the program offices, the Military Departments, and other defense agencies to facilitate the feasibility studies. For pre-MS A and B systems, OUSD(AT&L)/IC will ensure the DEF feasibility studies are addressed in their program Acquisition Strategies and Program Protection Plans (PPP). For Post-MS B platforms, when there is already a contract in place, OUSD (AT&L) will work with the program managers and contracting officers to implement the necessary contractual modifications to ensure that the feasibility studies were executed.			
FY 2017 Plans: - Funding will decrease in FY 2017 to account for the availability of prior year execution balances and to fund other programs as part of an internal OSD realignment of funds to achieve efficiencies. Funding will be sufficient to support the number of systems included in the Defense Exportability Features Pilot Program that are used to define and implement DEF 'best practice'			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
program management, system engineering, and program protection measures in the DoD acquisition process, and to cover more expensive follow-on DEF export design activities. In FY 2017, the pilot program is anticipating initiating or continuing contracts for DEF feasibility studies or DEF design activities on the following previously selected systems (plus any new DEF Pilot Program designated systems selected by OSD for FY 2017 - 2018): - Small Diameter Bomb II (US Air Force) - MQ-4C Triton formerly Broad Area Maritime Surveillance (US Navy) - Three-Dimensional Expeditionary Long-Range Radar (US Air Force) - Common Infrared Countermeasures (US Army) - Joint Air to Ground Missile (US Army) - Armored Multipurpose Vehicle (US Army) - Air and Missile Defense Radar (US Navy) - Indirect Fires Protection Capability (US Army) - Integrated Air and Missile Defense (US Army) (plus any new programs selected in FY16-17 that commence DEF studies or design activities) - Review of major defense acquisition programs for exportability as part of the major milestone review process. - Identify and select new pilot program candidates from Service Acquisition Executive nominations. - Identify Service leads and subject matter experts, to provide support to programs, prior to Milestone B, to develop plans for exportability features. - Manage, resource, and track the completion of the contractor exportability feasibility studies and design activities. - Oversee drafting of DEF Lessons Learned, Interim Progress Review briefings, and Final Reports from DEF studies conducted in FY 2017. - Draft and submit the annual report to Congress on the program. The focus for FY 2017 for the DEF pilot program will be to execute feasibility studies from newly selected DEF Pilot Programs that have yet to receive DEF funding, and to conduct follow-on DEF design studies on designated DEF pilot programs. As with the FY 2016 programs, FY 2017 feasibility studies will define the required actions for incorporating DEF into programs, begin DEF designs on select designated programs, and assess the potential costs of those actions. OUSD (AT&L) will continue to engage with program offices through the Military Department DEF POCs, and serve as a liaison among the program offices, the Military Departments, and other defense agencies to facilitate the feasibility studies. For pre-MS A and B systems, OUSD(AT&L)/IC will ensure the DEF feasibility studies are addressed in their program Acquisition Strategies and Program Protection Plans (PPP).			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
For Post-MS B platforms, when there is already a contract in place, OUSD (AT&L) will work with the program managers and contracting officers to implement the necessary contractual modifications to ensure that the feasibility studies were executed.			
Accomplishments/Planned Programs Subtotals	3.150	3.267	2.920

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

TBD

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Height of Burst Fuzing Defense Exportability Features (DEF) Program	MIPR	Picatinny Arsenal : NJ	2.148	1.510		0.617		0.000		-		0.000	Continuing	Continuing	-
Three Dimensional Extended Long Range Radar (3DELRR) DEF Program	C/CS	TBD - Competitive EMD Contract Award : TBD	1.560	0.000		0.900		0.500		-		0.500	Continuing	Continuing	-
Small Diameter Bomb II (SDB II) DEF Program	SS/CS	Raytheon Missile Systems : Tuscon, AZ	0.660	0.501		0.000		0.500		-		0.500	Continuing	Continuing	-
P-8A DEF Program	SS/CS	Boeing Company : Seattle, WA	0.231	0.000		0.000		0.000		-		0.000	0.000	0.231	-
Army Integrated Air and Missile Defense (AIAMD) DEF Program	SS/CS	Northrop Grumman : Huntsville, AL	0.650	0.814		0.000		0.445		-		0.445	Continuing	Continuing	-
Common Infrared Countermeasures (CIRCM) DEF Program	C/CS	TBD - Competitive EMD Contract Award : TBD	0.280	0.000		0.000		0.000		-		0.000	Continuing	Continuing	-
MQ-4C Triton (formerly BAMS) DEF Program	SS/CS	Northrop Grumman : San Diego, CA	0.800	0.000		0.000		0.400		-		0.400	Continuing	Continuing	-
Indirect Fires Protection Capability (IFPC) DEF Program	MIPR	Redstone Arsenal : Huntsville, AL	0.000	0.000		0.250		0.400		-		0.400	Continuing	Continuing	-
Joint Air-to-Ground Missile (JAGM) DEF Program	SS/CS	Lockheed Martin : Huntsville, AL	0.000	0.000		0.500		0.400		-		0.400	Continuing	Continuing	-
Miniature Air Launched Decoy (MALD) DEF Program	C/CS	TBD - Competitive Award : TBD	0.000	0.000		0.675		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	6.329	2.825		2.942		2.645		-		2.645	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / *Defense Exportability Program*	Project (Number/Name) P013 / *Defense Exportability Features (DEF) Program*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DEF Contract Support	C/FFP	LMI : McLean, VA	0.584	0.275		0.275		0.275		-		0.275	Continuing	Continuing	-
DEF Contract Support - AAAS	MIPR	Oak Ridge Institute : AL	0.147	0.000		0.000		0.000		-		0.000	0.000	0.147	-
		Subtotal	0.731	0.275		0.275		0.275		-		0.275	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Height of Burst Fuzing DEF Mgmt Support	MIPR	Picatinny Arsenal : NJ	0.150	0.050		0.050		0.000		-		0.000	0.000	0.250	-
		Subtotal	0.150	0.050		0.050		0.000		-		0.000	0.000	0.250	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.210	3.150		3.267		2.920		-		2.920	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

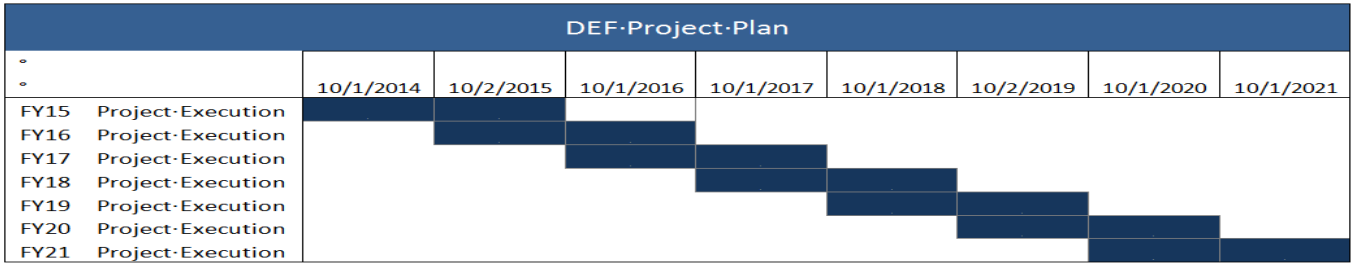

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605022D8Z / *Defense Exportability Program*	**Project (Number/Name)** P013 / *Defense Exportability Features (DEF) Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 DEF Studies	1	2015	4	2016
FY16 DEF Studies	1	2016	4	2017
FY17 DEF Studies	1	2017	4	2018
FY18 DEF Studies	1	2018	4	2019
FY19 DEF Studies	1	2019	4	2020
FY20 DEF Studies	1	2020	4	2021
FY21 DEF Studies	1	2021	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605027D8Z / *OUSD(C) IT Development Initiative*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	27.367	6.300	4.962	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
927: *Next Generation Resource Management System*	27.367	6.300	4.962	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

As the Department of Defense strategic, operational, and tactical plans and objectives transform the war fighter with new capabilities and doctrine, the budgeting and accountability of funds used to pursue the Department objectives will become more complicated and detailed for senior leaders to make decisions with supporting rationale for the taxpayer. Incorporating information technology toward current and emerging business processes manifesting into a state-of-the art system of systems will result in increasing efficiencies, timely diagnostics, and reducing lifecycle costs to maintain, sustain and repair.

This initiative exploits emerging technology, processes, trends, capabilities, and techniques to incorporate state-of-the-art information technology enabling the ability, agility, and level of fidelity to collect, process, administrate and report resource management data and to automate business processes within a more robust analytical environment within the Office of the Under Secretary of Defense (Comptroller) OUSD(C).

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	6.500	5.962	2.972	-	2.972
Current President's Budget	6.300	4.962	0.000	-	0.000
Total Adjustments	-0.200	-1.000	-2.972	-	-2.972
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-0.197	-			
• Congressional Directed Reduction	-	-	-2.972	-	-2.972

Change Summary Explanation

The program is moving to DLA beginning in FY2017 to align funding with the program office for more efficient execution.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605027D8Z / *OUSD(C) IT Development Initiative*	Project (Number/Name) 927 / *Next Generation Resource Management System*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
927: *Next Generation Resource Management System*	27.367	6.300	4.962	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Department's budget focuses on institutionalizing and financing our capabilities to fight the wars we are in today and the scenarios we are most likely to face in the years ahead, while at the same time mitigating risk and providing for contingency operations. It also includes a fundamental overhaul of the DoD's approach to procurement, acquisition, and contracting. As such, the complex details of budgeting and tracking of funds become increasingly critical to senior leader decision making and to provide accountability to the taxpayer. Incorporating information technology toward current and emerging business processes manifesting into a state-of-the art system of systems will result in increasing efficiencies, timely diagnostics, and reducing lifecycle costs to maintain, sustain and repair.

Today, the Office of the Under Secretary of Defense Comptroller OUSD(C) and the Cost Analysis and Program Evaluation (CAPE) use various distinct automated systems (Comptroller Information System (CIS), Program Resource Collection Process (PRCP), Supplemental Resource Collection Process (SRCP), Budget Exhibits Generator and Standard Data Collection System (SDCS)) to formulate, justify, and execute DoD budgets. These six or more systems interact with at least several computer-based systems controlled by external organizations and agencies. These systems manage very similar financial information, yet each uses its own scheme for representing information. Much of the information managed by these systems is redundant. Cross-system data representations and redundancies make it difficult to exchange and to reconcile information. The capabilities provided by Comptroller systems, in some cases, fail to deliver services needed by its users, or fail to operate in ways that complement current and emerging business practices. They fail to give executives information in a comprehensible form, making it difficult to draw conclusions. Data disparities and functional redundancy make these systems more costly to maintain than they need to be.

There is a critical need for the development of a state-of-the-art information technology system to modernize and replace multiple, antiquated legacy systems and processes used to formulate, justify, present and defend the entire Department of Defense Budget in the Office of the Under Secretary of Defense (Comptroller) (OUSD(C)) to meet Title 10 and Title 31 mission and reporting requirements. The Comptroller's plan for mitigating the deficiencies and capability gaps associated with current systems is development of the Next Generation Resource Management System.

This initiative exploits emerging technology, processes, trends, capabilities, and techniques to incorporate state-of-the-art information technology enabling the ability, agility, and level of fidelity to collect, process, administer and report resource management data and to automate business processes within a more robust analytical environment within the Office of the Under Secretary of Defense (Comptroller) OUSD(C). Funded efforts will improve the timeliness of resource management reviews and decisions for senior leaders and Congress.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Next Generation Resource Management System	6.300	4.962	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605027D8Z / *OUSD(C) IT Development Initiative*	**Project (Number/Name)** 927 / *Next Generation Resource Management System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Description: Plan, develop, test and evaluate the system components (i.e. unified database, expert system, cross domain security, enterprise service bus, applications, services) and supportability requirements in modernizing the budget formulation, programming execution and reporting capabilities for the Department of Defense. Activities will include, but not be limited to, the preparation of all documentation required for Clinger-Cohen Compliance and acquisition regulations, developing requests for proposals, and oversight and management of contracts and deliverables. ***FY 2015 Accomplishments:*** Continued Program Management Office 1Q FY 2015-4Q FY 2015 Increment 1.0 Milestone B 2Q FY 2015 Task Order award for Increment 2.0 4Q 2015 ***FY 2016 Plans:*** Continue Program Management Office 1Q FY 2016-4Q FY 2016 Increment 1.0 Deployment 2Q 2016 Increment 2.0 Milestone B 4Q FY 2016 ***FY 2017 Plans:*** The program is transferred to DLA in FY17.			
Accomplishments/Planned Programs Subtotals	6.300	4.962	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

IDIQ with Contractor Teaming Arrangement (CTA) partners, 40% small business participation
Materiel Development Decision (MDD) 2Q FY2013
Approval to Enter Acquisition LifeCycle at Milestone B by the MDA 4Q FY2013
NGRMS Contract Award Date 4Q FY2014
Milestone B for Increment 1.0 2Q FY2015
Milestone C for Increment 1.0 2Q FY2016
Full Deployment Decision for Increment 1.0 2Q FY2016
Increment 2.0 Contract Award 4Q FY2015
Milestone B for Increment 2.0 4Q FY2016

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605027D8Z / *OUSD(C) IT Development Initiative*	**Project (Number/Name)** 927 / *Next Generation Resource Management System*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605027D8Z / *OUSD(C) IT Development Initiative*	Project (Number/Name) 927 / *Next Generation Resource Management System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next Generation Resource Management System	MIPR	Defense Logistics Agency : Mark Center	22.744	5.370	Jul 2015	4.862	Aug 2016	0.000		-		0.000	0	32.976	32.976
		Subtotal	22.744	5.370		4.862		0.000		-		0.000	0.000	32.976	32.976

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next Generation Resource Management System	MIPR	Defense Logistics Agency : Mark Center	4.623	0.930	Jan 2015	0.100	Jan 2016	-		-		-	0	5.653	5.653
		Subtotal	4.623	0.930		0.100		-		-		-	0.000	5.653	5.653

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	27.367	6.300		4.962		0.000		-		0.000	0.000	38.629	38.629

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605027D8Z / *OUSD(C) IT Development Initiative*	**Project (Number/Name)** 927 / *Next Generation Resource Management System*

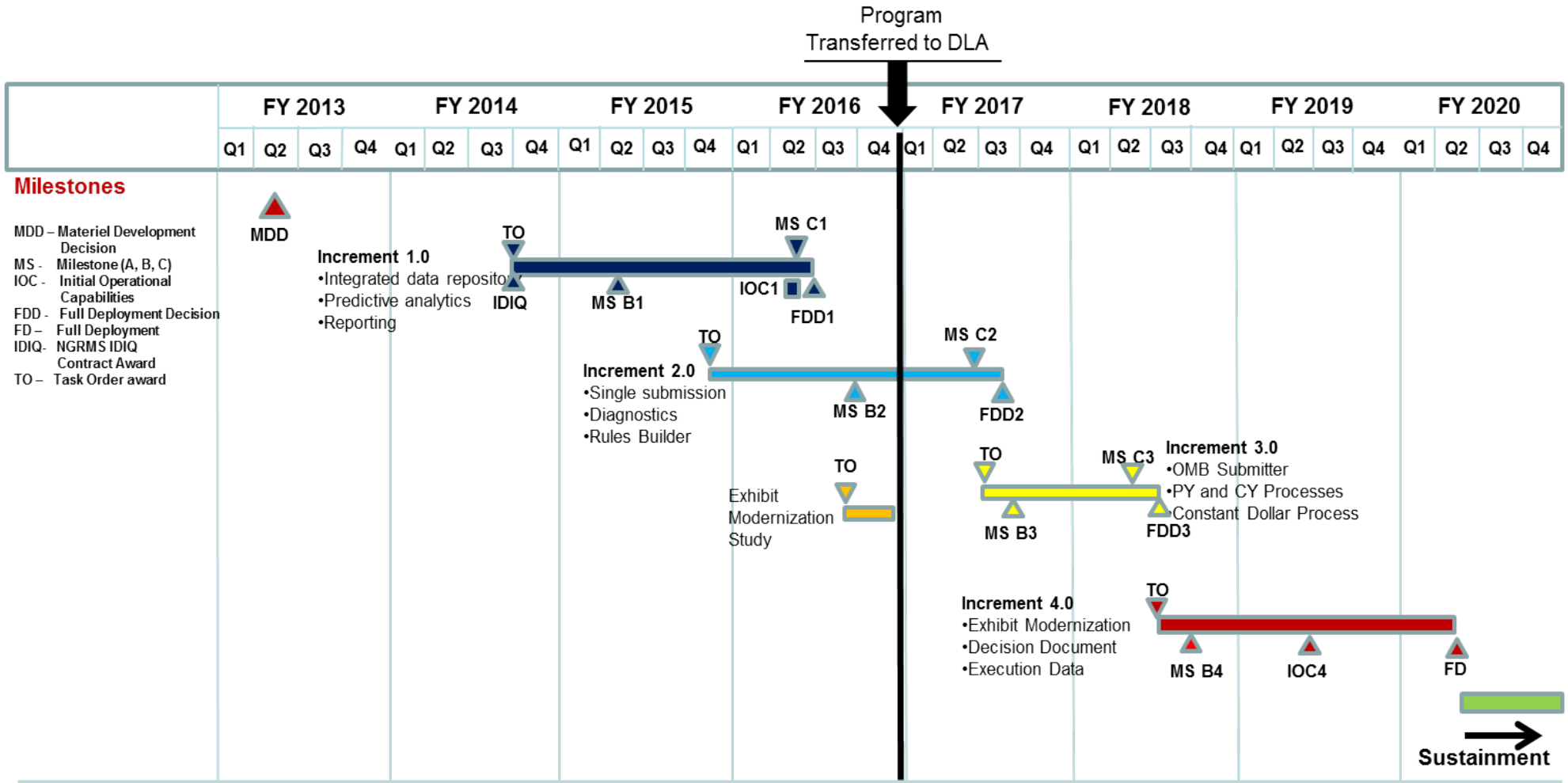

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605027D8Z / *OUSD(C) IT Development Initiative*	**Project (Number/Name)** 927 / *Next Generation Resource Management System*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Acquisition Milestones B1, C1, FDD1 - Increment 1.0	4	2014	2	2016
Acquisition Milestones C2, B2, FDD2 - Increment 2.0	4	2015	3	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605075D8Z / *DCMO Policy and Integration*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	69.341	18.682	2.219	0.000	-	0.000	2.813	2.117	1.636	1.668	Continuing	Continuing
075: *DCMO Policy and Integration*	69.341	18.682	2.219	0.000	-	0.000	2.813	2.117	1.636	1.668	Continuing	Continuing

A. Mission Description and Budget Item Justification

To produce and sustain a Business Enterprise Architecture (BEA) to guide business transformation and business system investment actions for the DoD. The requirement to produce and maintain a BEA is codified in NDAA 2012, USC Title 10, Section 2222 with amplifying guidance from OMB. The proposed program provides improved capabilities to access and use the BEA information including descriptions of business processes and associated information assets; required capabilities and associated performance requirements; and governing laws, regulations and policies (LRPs).

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	19.324	2.223	1.979	-	1.979
Current President's Budget	18.682	2.219	0.000	-	0.000
Total Adjustments	-0.642	-0.004	-1.979	-	-1.979
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	-0.004			
• SBIR/STTR Transfer	-0.638	-			
• Other Adjustments	-	-	-1.979	-	-1.979

Change Summary Explanation

FY 2017 reduction is a result of rephasing which will restored the funds in FY 2018 and 2019.

The FY2017 Funding was reduced by $1.979 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605075D8Z / *DCMO Policy and Integration*	Project (Number/Name) 075 / *DCMO Policy and Integration*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
075: *DCMO Policy and Integration*	69.341	18.682	2.219	0.000	-	0.000	2.813	2.117	1.636	1.668	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To produce and sustain a Business Enterprise Architecture (BEA) to guide business transformation and business system investment actions for the DoD. The requirement to produce and maintain a BEA is codified in NDAA 2012, USC Title 10, Section 2222 with amplifying guidance from OMB. The proposed program provides improved capabilities to access and use the BEA information including descriptions of business processes and associated information assets; required capabilities and associated performance requirements; and governing laws, regulations and policies (LRPs).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: DCMO Policy and Integration	18.682	2.219	0.000
FY 2015 Accomplishments: BEA Compliance, Standards, and DCMO Tools Implementations • Delivered more efficient and effective applications and information resource capabilities supporting DCMO Title 10 Section 2222 responsibilities for Defense Business Enterprise Architecture. • Designed and delivered new enterprise architecture products comprising BEA content and features to support OSD business outcomes, performance/process improvement initiatives and Federal reporting requirements. This includes content collected during business process system reviews. • Incorporated other mission area owner requirements and provided support for enterprise level security development to ensure Warfighter, Enterprise Information Environment, and Intelligence Mission Area architectural alignment, implementation and information sharing is enabled across the Business Mission Area. • Conceived and drafted revised design and deployment requirements to support BEA restructuring under supporting OSD organization actions and reviews. This included the structure improvements for Business Case Analysis and Service Development and Delivery Process (SDDP) artifacts. • Developed and delivered enhanced enterprise wide visualization and analysis capabilities in coordination with CIO partners supporting the DoD Business Process and System Reviews (BPSRs) as well as overall DoD mission area system analysis. • Continued with technology innovation to support more and better alignment of business operations for the Department. Innovations will further support a strategic alignment of BEA views of operational activities and processes to include the capture of BCA/SDDP reference models, outcomes and performance measures. • Developed data integration scripts for automated processing of authoritative data source information and for staging of content for future shared web-service cloud environment.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605075D8Z / *DCMO Policy and Integration*	**Project (Number/Name)** 075 / *DCMO Policy and Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Implemented key segments of the BEA technology strategy to improve the articulation of business requirements and performance metrics, including strengthening outreach to US Air Force on Enterprise Level Security as well as other DoD and Federal business stakeholders, decision makers and civilian and commercial business leaders. • Continued the evolution of open architecture and data standards in support of DoD requirements and processes for enabling and implementing enterprise level applications. • Enabled deployment of DBS capabilities consistent with evolving BEA direction and guidance. • Continued to design, develop and deploy tools for the evolving and changing emphasis in oversight of the BMA with continued emphasis on support to policy and process change and technology insertion. Continue to operate and deploy pilot activities and tools in the BMA. ***FY 2016 Plans:*** • Design and deliver more efficient and effective applications and information resource capabilities supporting DCMO Title 10 Section 2222 responsibilities for Defense Business Enterprise Architecture. • Design and deliver new enterprise architecture products comprising BEA content to support OSD business outcomes, performance/process improvement initiatives and Federal reporting requirements. This includes content collected during BPSRs. • Continue incorporating other mission area owner requirements and provide interoperability development to ensure Warfighter, Enterprise Information Environment, and Intelligence Mission Area architectural alignment, implementation, and information sharing (including compliance reporting) with the BMA. • Assess requirements and innovative utilization of technology to support enhanced alignment of business operations for the Department. • Continue technology innovation to support enhanced alignment of business operations for the Department. • Continue evolution of open architecture and data standards in support of DoD requirements and processes enabling and implementing enterprise level business applications. • Establish requirements for the evolving and changing emphasis in management of the OSD with continued emphasis on support to policy and business process change and technology insertion. • Design, develop and deploy tools for the evolving and changing emphasis in oversight of the BMA with continued emphasis on support to policy and process change and technology insertion. Continue to operate and deploy pilot activities and tools in the BMA. ***FY 2017 Plans:*** Sustain this effort with previous year funding deliver more efficient and effective applications and information resource capabilities supporting DCMO Title 10 Section 2222 responsibilities for Defense Business Enterprise Architecture			
Accomplishments/Planned Programs Subtotals	18.682	2.219	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605075D8Z / *DCMO Policy and Integration*	**Project (Number/Name)** 075 / *DCMO Policy and Integration*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Section 2222 of Title 10, USC required that a single Business Mission Area (BMA) Investment Review Board (IRB) be established. As part of the stand-up of this single IRB, Principal Staff Assistant (PSA) and DoD Components are charged with specifying and delivering required business outcomes for the Department. These business outcomes are then incorporated into the architecture and data products making up the Department's Business Enterprise Architecture (BEA), under the oversight and direction of the Defense Business Council. These metrics measure the incorporation of the Component identified business outcomes and associated component organizational alignments into the BEA. •FY 2015 Goal: 90% of business outcomes and PRM/BRM performance data incorporated into the BEA.
•FY 2016 Goal: 100% of business outcomes and PRM/BRM performance data incorporated into the BEA.•FY 2017 Goal: 100% of business outcomes and PRM/BRM performance data incorporated into the BEA. Section 2222 of Title 10, USC further required that the defense business enterprise architecture include an information infrastructure to enable the producing of timely accurate and reliable business information. This metric measures the discoverability of BEA content that supports DoD decision making.

• FY 2015 Goal: 70% of BEA data artifacts are discoverable via web services.
• FY 2016 Goal: 87% of BEA data artifacts are discoverable via web services.
• FY 2017 Goal: 100% of BEA discoverable data artifacts transitioned to a government cloud based information environment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605075D8Z / *DCMO Policy and Integration*	**Project (Number/Name)** 075 / *DCMO Policy and Integration*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design enterprise architecture taxonomy	Option/ CPFF	DCMO : Mark Center	60.386	6.121		-		-		-		-	-	-	-
Capability to automate and generate metadata on ingest of architecture information	Option/ CPFF	DCMO : Mark Center	7.999	6.763		-		-		-		-	-	-	-
Extend user access to BEA via web services	Option/ CPFF	DCMO : Mark Center	0.956	2.899		2.219		0.000		-		0.000	-	-	-
Port BEA into Cloud environment	Option/ CPFF	DCMO : Mark Center	-	2.899		-		-		-		-	-	-	-
		Subtotal	69.341	18.682		2.219		0.000		-		0.000	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	69.341	18.682		2.219		0.000		-		0.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605075D8Z / *DCMO Policy and Integration*	Project (Number/Name) 075 / *DCMO Policy and Integration*

Exhibit R-4, RDT&E Program Schedule Profile:		Date: August 2015
Appropriation/Budget Activity: 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 5: System Development & Demonstration (SDD)	Program Element Number and Name: PE 0605075D8Z / DCMO Policy and Integration	Project Number and Name: DCMO Policy and Integration

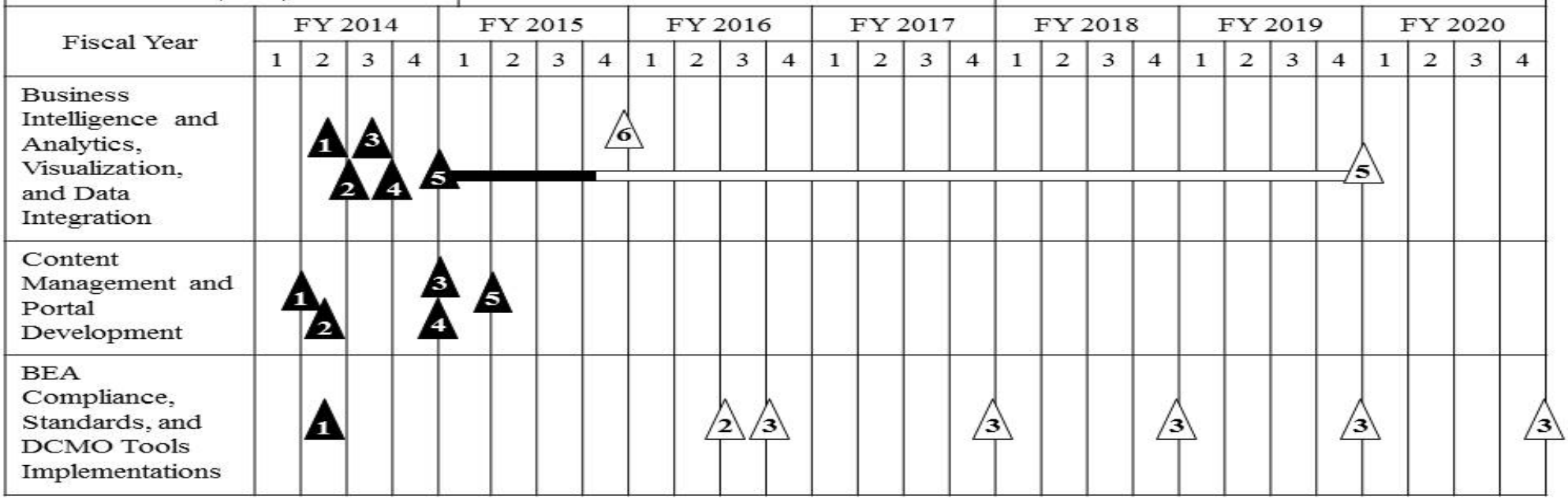

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605075D8Z / *DCMO Policy and Integration*	**Project (Number/Name)** 075 / *DCMO Policy and Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Business Intelligence and Ananlytics Visualization and Data Integration				
Data Source Integration/Ab Initio Data Processing	2	2014	2	2014
Investment Review Analytics development/deployment	3	2014	4	2014
Enterprise Transition Plan Analytics	3	2014	3	2014
Out of Cycle Review Analytics	3	2014	3	2014
Develop Business Intelligence & Analytics (BIA)	4	2014	4	2019
BIA infrastructure	4	2015	4	2015
Content Management and Protal Development				
DoD Conference Reporting system	1	2014	1	2014
BMA Problem Statement Tool development/deployment	2	2014	2	2014
Lean Six Sigma Migration development/deployment	4	2014	4	2014
Human Resources Portal development/deployment	4	2014	4	2014
SharePoint development to include claims-based authentication and defense enterprise email migration	1	2015	2	2015
BEA Compliance, Standards, and DCMO Tools Implementations				
Design and deliver a restructured BEA technology solution	2	2014	2	2014
Incorporate Acquisition Oversight/MAIS requirements into BEA	3	2016	3	2016
Support for Federal Reporting and Performance Initiatives	4	2016	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	69.000	-	69.000	91.300	99.300	97.600	96.800	Continuing	Continuing
P837: *Trusted Mask Trust Approach*	-	0.000	0.000	2.000	-	2.000	2.000	2.000	2.000	2.000	Continuing	Continuing
P838: *V&V Capabilities and Standards for Trust*	-	0.000	0.000	19.200	-	19.200	42.000	42.000	40.300	39.500	Continuing	Continuing
P839: *New Trust Approach*	-	0.000	0.000	47.800	-	47.800	47.300	55.300	55.300	55.300	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) supports activities to ensure critical and sensitive integrated circuits are available to meet the DoD's needs. It refines strategies and management planning activities that will (1) provide support to acquisition programs to address trusted microelectronics supply needs; (2) improve capability to evaluate and validate trust of microelectronic parts and advance standards to incentive the commercial marketplace to recognize trust as a competitive design standard; and (3) develop and demonstrate alternative approaches to the current DoD Trusted Supplier accreditation process and criteria to assuring the trust of the microelectronics supply chain in order to enable broader DoD access to commercial state-of-the-art (SOTA) microelectronics technology.

This activity will be coordinated by the Office of the Assistant Secretary of Defense for Research and Engineering, and will include performers from the DoD Components, the Defense Microelectronics Activity (DMEA), the Joint Federated Assurance Center (JFAC), the Defense Advanced Research Programs Agency (DARPA), other DoD and Intelligence Community science and technology (S&T) organizations and laboratories, defense industry, and the broader commercial industrial base. It will integrate the functions of the DoD Trusted Foundry Program, the Trusted Supplier accreditation program, JFAC, and related S&T activities.

This activity implements, maintains and updates the DoD's long-term microelectronics strategy. Recognizing that trusted and assured supply of microelectronics is a Government-wide concern, this activity will interface with interagency partners to take into account interagency requirements, opportunities for collaboration, and strategic decisions that can be made to limit the overall cost of these requirements to the government.

Funds in the amount of $7M are being reprogrammed in FY 2016; consequently, these funds are not reflected in the current President's Budget. This add is for preparation activities supporting the initiation of Trusted Foundry activities in FY 2017; a $47.8 million add in FY 2017 supports the initiation of the Trusted Mask Trust Approach, Verification and Validation (V&V) Capabilities and Standards, and New Trust Approach project activities planned across the Future Years Defense Program (FYDP).

Total PE funding from FY 2017 - FY 2021 is as follows:

FY 2017 = $69.0M / FY 2018 = $91.3M / FY 2019 = $99.3M / FY 2020 = $97.6M / FY 2021 = $96.8M

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	69.000	-	69.000
Total Adjustments	0.000	0.000	69.000	-	69.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	-	-	69.000	-	69.000

Change Summary Explanation

This add is to support the initiation of Trusted Foundry activities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605140D8Z / *Trusted Foundry*	Project (Number/Name) P837 / *Trusted Mask Trust Approach*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P837: *Trusted Mask Trust Approach*	-	0.000	0.000	2.000	-	2.000	2.000	2.000	2.000	2.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops a new secure (SECRET-level) photomask manufacturing capability down to 14 nanometer (nm) at an existing leading-edge commercial photomask manufacturing supplier to secure the masks and design Internet Protocol (IP) of acquisition programs. This capability can be used in conjunction with one or more leading-edge untrusted commercial foundries. This capability will address needs for trusted masks at technology node sizes < 130nm.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Trusted Mask Trust Approach	-	0.000	2.000
FY 2016 Plans: In FY 2016, the Defense Microelectronics Activity (DMEA) will: (1) prepare the Defense Production Act (DPA) Title III case for the expansion and upgrade of the Trusted commercial photomask manufacturing supplier facilities and (2) prepare the solicitation and contracting package to extend the supplier's Trusted photomask capabilities as required to be compatible with other leading-edge and Trusted state-of-the-practice foundries supporting microelectronic technology node sizes < 130 nanometer (nm).			
FY 2017 Plans: In FY 2017, DMEA will conduct management and technical support, as required, to preserve secure mask data parsing services for the Department, as well as other Federal entities, with an existing Trusted leading-edge commercial photomask manufacturing supplier to ensure the integrity of the tape-in/mask release, mask manufacturing, and authentication process for photomasks. Over the Future Year Defense Program (FYDP), a new secure (SECRET-level) photomask manufacturing capability at a leading-edge Trusted Supplier facility will be equipped ($7.2M is planned as a FY 2017 DPA Title III project) and staffed to provide the required critical Trusted photomask capabilities.			
Accomplishments/Planned Programs Subtotals	-	0.000	2.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P837 / *Trusted Mask Trust Approach*

E. Performance Metrics

Performance for this project is monitored in the following ways:

- Number of photomasks created using the secure photomask manufacturing capability.
- Number of acquisition programs using the secure photomask manufacturing capability.
- Number of technology node sizes supported by the secure photomask manufacturing capability.
- Number of foundries supported by the secure photomask manufacturing capability.
- Initial Operational Capability (IOC) is planned for FY 2018 assuming the related DPA Title III project completion in FY 2017.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605140D8Z / *Trusted Foundry*	Project (Number/Name) P837 / *Trusted Mask Trust Approach*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Trusted Mask Trust Approach Program Support	MIPR	Defense Microelectronics Activity (DMEA) : Sacramento, CA	-	-		-		2.000	Mar 2017	-		2.000	0.000	2.000	Continuing
		Subtotal	-	-		-		2.000		-		2.000	0.000	2.000	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		2.000		-		2.000	0.000	2.000	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P837 / *Trusted Mask Trust Approach*

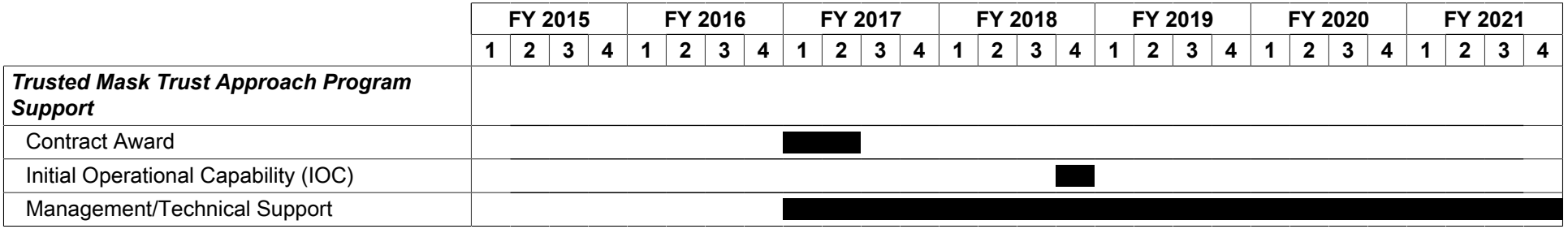

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P837 / *Trusted Mask Trust Approach*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Trusted Mask Trust Approach Program Support				
Contract Award	1	2017	2	2017
Initial Operational Capability (IOC)	4	2018	4	2018
Management/Technical Support	1	2017	4	2021

Note

See attached chart.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605140D8Z / *Trusted Foundry*	Project (Number/Name) P838 / *V&V Capabilities and Standards for Trust*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P838: *V&V Capabilities and Standards for Trust*	-	0.000	0.000	19.200	-	19.200	42.000	42.000	40.300	39.500	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project improves microelectronics test and verification methodologies in support of verifying trust of untrusted parts and develops standards/practices to foster commercial development of secure and trusted parts. Verification and test technologies are required to provide direct program support for microelectronics trust verification when DoD Trusted Foundry Program options are not available. Core technical laboratories have recently been chartered as a Joint Federated Assurance Center (JFAC) to provide this support. Out-year demands will require an increase in capacity, which will take the form of additional personnel and/or equipment to permit scaling of assessment capabilities. Challenges have been identified, to include the ability to analyze leading-edge technologies, throughput/time required for analysis, ability to analyze third-party IP contained in microelectronic components, and analysis of non-application-specific integrated circuit (ASIC) components that are increasingly being used for agility, e.g., Field-Programmable Gate Arrays (FPGAs). This project addresses these gaps in current technical capabilities in a collaborative nature amongst the core technical laboratories, driven by projected and realized out-year demand. Three capability areas core to microelectronics analysis and verification will be improved:

- Physical verification, i.e., destructive analysis of integrated circuits and printed circuit boards
- Functional analysis, i.e., non-destructive screening/verification of select, critical parts
- Design verification, i.e., verification/assurance of designs, IP, netlists, bitstreams, firmware, etc.

These improvements will address two primary attributes: (1) technical capability: laboratory equipment, analysis tools, such as imaging software, and highly skilled tradecraft, and (2) the capacity to perform assessments.

This project also develops standards/practices in support of trustworthy designs and supply chains.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Verification and Validation (V&V) Capabilities and Standards for Trust	-	0.000	19.200
FY 2016 Plans: In FY 2016, at each core Joint Federated Assurance Center (JFAC) laboratory, i.e., Air Force, Army, Navy, and National Security Agency, will fund a dedicated technical government subject matter expert and provide support for identified JFAC acquisition program pilots and non-program-related assessments, e.g., suspicious parts acquired by law enforcement or that failed in the			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P838 / *V&V Capabilities and Standards for Trust*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
field. In addition, utilizing the 2015 JFAC hardware assurance capability survey, develop a plan of action based on incremental technical improvement and capacity across participating JFAC laboratories in the following areas; • Equipment re-capitalization and new equipment • Data and imaging processing • Enhanced automation • Technology and IP licensing • Training and SME development • Maintenance support • Feasibility studies • Reimbursable (test fixtures, boards, parts, and supplies) • Direct program support (4) in related areas beyond the acquisition program's technical capability or capacity to address. ***FY 2017 Plans:*** In FY 2017, the JFAC will: (1) improve its microelectronics test and verification methodologies in support of verifying trust of untrusted parts and (2) develop standards/practices to foster commercial development of secure and trusted parts. Verification and test technologies: Initiate: • Improvements to the core JFAC's (1) technical capability, i.e., laboratory equipment, analysis tools, such as imaging software, and highly skilled tradecraft, and (2) the capacity to perform assessments. Out-year demands will continue to require an increase in capacity, which will take the form of additional personnel and/or equipment to permit scaling of assessment capabilities. • Enhancement of automation needed to increase the throughput of information produced by individual JFAC laboratory tools as well as to facilitate information sharing across the families of tools used for analysis and testing. • Development of common SME training and protocols based on the existing tool base, to include both commercial and government-developed tools. • Funding of an additional SME per core laboratory in support of the microelectronics trust verification and other JFAC-related work. • Cost sharing of direct program support prioritized for FY 2017 focused on addressing technical gaps and trust-related findings. • Investment in the above technical areas based on priority and monitor and report increased technical capability from the baseline 2016 level. Standards and Practices: Initiate: • Development of standards and best practices, and relationships with industry, to foster commercial development of secure and trusted parts. • Establishment of formal relationships with FPGA vendors and other key commercial suppliers to improve device and IP security.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P838 / *V&V Capabilities and Standards for Trust*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Acquisition of government access to proprietary designs, software, development, and quality assurance processes and test procedures to develop design practices that minimize security flaws and facilitate verification. • Establishment of government and industry working groups to develop test procedures to validate the trust of designs. • Documentation and promulgation of security-enhancing design practices across government, industry, and academia. • Development of industry-wide standards and practices to establish a common understanding of what constitutes verified and trusted hardware/software/firmware at both the component and systems level. • Development of a common lexicon for secure hardware/software/firmware in collaboration with the Committee for National Security Systems, National Institute of Standards and Technology, Society of Automotive Engineers (SAE) International, etc. • Definition of supply chain controls for assured chain of custody for critical and other microelectronics devices and IP. • Development of security training and educate government and industry system security engineers and material managers on supply chain and life-cycle management best practices using agreed-upon language, standards, and practices • Alignment of DoD Instruction 5200.44 (Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN)), related policies, and National Institute of Technology (NIST) 800-161 (Supply Chain Risk Management Practices for Federal Information Systems and Organizations) with industry standards identifying and addressing gaps in definition and criteria and establishing universally accepted levels of supplier and part trustworthiness.			
Accomplishments/Planned Programs Subtotals	-	0.000	19.200

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance for this project is monitored in the following ways:

- Increases in throughput in current JFAC laboratories, and stands-up of additional capability/capacity as required, so that at least two laboratories will have capability in physical verification, functional analysis, and design verification to increase the DoD's overall microelectronics trust verification and test capacity for analysis of state-of-the practice parts.
- Increased Probability of Detection of malicious insertion and/or counterfeit parts.
- Cost to evaluate components.
- Time to evaluate components.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P838 / *V&V Capabilities and Standards for Trust*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V&V Capabilities and Standards for Trust Program Support	MIPR	Various (Air Force, Army, Navy, NSA) : Various	-	-		-		19.200	Mar 2017	-		19.200	0.000	19.200	Continuing
		Subtotal	-	-		-		19.200		-		19.200	0.000	19.200	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		19.200		-		19.200	0.000	19.200	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P838 / *V&V Capabilities and Standards for Trust*

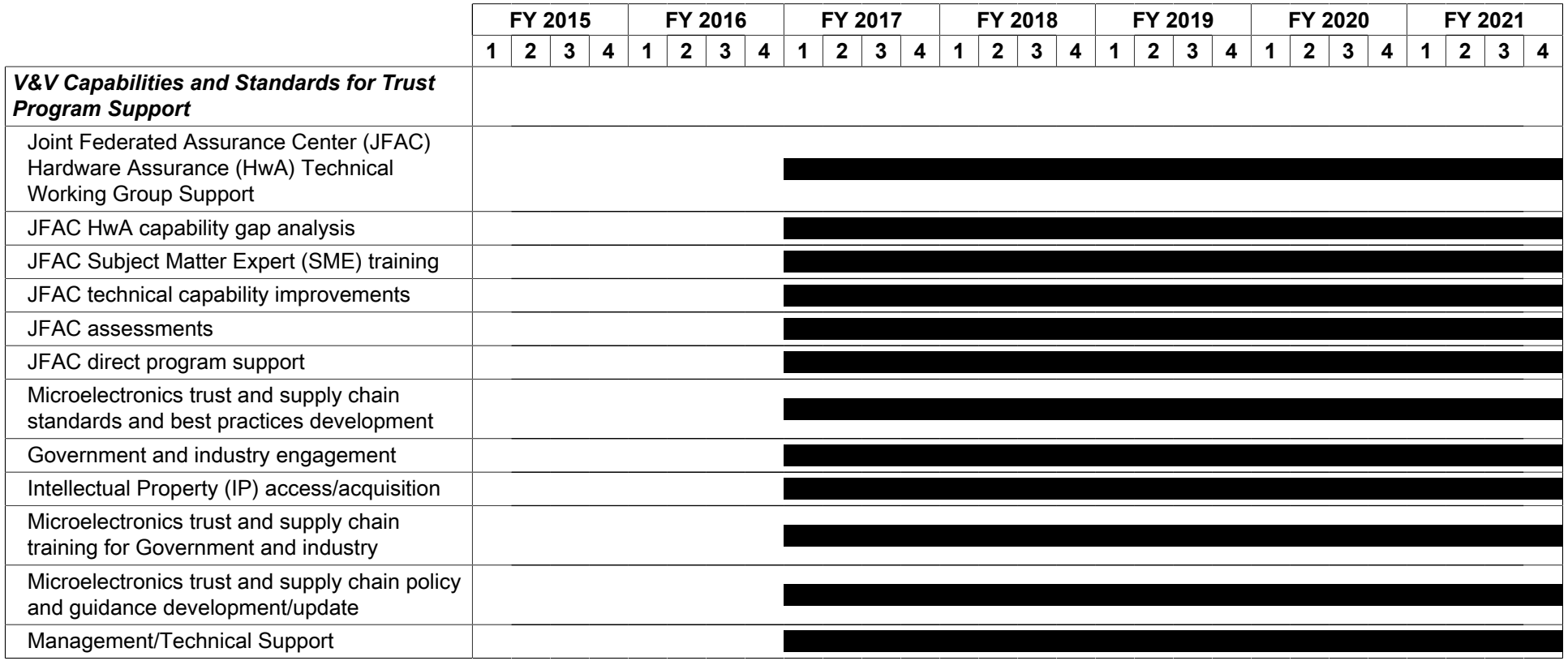

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P838 / *V&V Capabilities and Standards for Trust*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
V&V Capabilities and Standards for Trust Program Support				
Joint Federated Assurance Center (JFAC) Hardware Assurance (HwA) Technical Working Group Support	1	2017	4	2021
JFAC HwA capability gap analysis	1	2017	4	2021
JFAC Subject Matter Expert (SME) training	1	2017	4	2021
JFAC technical capability improvements	1	2017	4	2021
JFAC assessments	1	2017	4	2021
JFAC direct program support	1	2017	4	2021
Microelectronics trust and supply chain standards and best practices development	1	2017	4	2021
Government and industry engagement	1	2017	4	2021
Intellectual Property (IP) access/acquisition	1	2017	4	2021
Microelectronics trust and supply chain training for Government and industry	1	2017	4	2021
Microelectronics trust and supply chain policy and guidance development/update	1	2017	4	2021
Management/Technical Support	1	2017	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605140D8Z / *Trusted Foundry*	Project (Number/Name) P839 / *New Trust Approach*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P839: *New Trust Approach*	-	0.000	0.000	47.800	-	47.800	47.300	55.300	55.300	55.300	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds a technology demonstration and transition program to develop, demonstrate and pilot the next generation, technology-driven approach to microelectronics trust, to ensure continued access to leading-edge microelectronic technologies while maintaining the required level of trust in all environments. DoD's ability to access commercial technology for its custom trusted needs is diminishing as leading-edge suppliers become fewer and more focused on serving the global commercial market. DoD's technology needs are broad, and relying on a single source supplier is not feasible. Alternative, advanced manufacturing methods, technologies, and design tools are needed to produce trusted state-of-the-art (SOTA) parts from untrusted sources and to preserve access to these advanced nodes while protecting DoD and Defense Industrial Base IP from exploitation. It also is intended to dramatically improve the capabilities of the Joint Federated Assurance Center (JFAC) with regard to verification and validation of microelectronics trust.

This program will develop innovative design, manufacturing, imaging, tagging, and control and assessment approaches for protecting DoD's microelectronics supply chain and IP. It develops advanced imaging technologies and forensics, Design for Trust techniques, active hardware trust control, electronic component markers, and a data and analysis capability to enable auditing and independent verification and validation of commercial designs. It also develops, demonstrates, and implements concepts for the cost-effective production of custom microelectronics in low volumes and protection of sensitive Internet Protocol (IP) from exploitation.

Technologies that assure trust in a broad range of trusted and non-trusted environments can mitigate the risks associated with sole-source suppliers, allow DoD to quickly respond to the loss of a Trusted Foundry, and increase Government's ability to leverage commercial capabilities. The suite of developed technologies will enable DoD to obfuscate the purpose of sensitive devices, verify their origin and function, and protect sensitive IP from exploitation even while using the global supply chain for most hardware. In cases where the risk involved precludes that level of commercial collaboration, low-volume manufacturing technologies developed under this project would permit DoD to more cheaply produce low volumes of sensitive microelectronics in trusted environments. The project would also support using a repository of third-party IP to expedite circuit design and transition promising technologies to use.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: New Trust Approach	-	0.000	47.800
FY 2016 Plans: In FY 2016, studies and Broad Agency Announcements (BAAs) will be conducted to fully develop and initiate the program. In addition, FY 2017 acquisition program pilots and/or technology demonstrations of mature trust technologies and techniques will be identified and planned.			
FY 2017 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P839 / *New Trust Approach*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
In FY 2017, initiate the conduct of identified acquisition program pilots and technology demonstrations in accordance with the FY 2016 plan and coordinate efforts across sponsored BAAs, government R&D organizations, academia and industry. Initiate technology transition programs in the following technical areas: • Design-For-Trust Techniques • IP Protection • Low-Volume SOTA • Electronic Component Markers • Imaging Technologies and Forensics • Computing Infrastructure and Processing Methods. Primary efforts include maturing and demonstrating technologies enabling trusted (1) design, (2) access, (3) component integrity and (4) IP protection. Activities will assess and report technical progress against the FY 2016 plan. Engage early on with potential acquisition stakeholder to identify potential transition opportunities. Aid transition through joint collaboration between research teams and stakeholders with a focus on evaluations of prototype, test articles and beta versions of tools, techniques, methods, etc. and their use in operationally-realistic scenarios.			
Accomplishments/Planned Programs Subtotals	-	0.000	47.800

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance for this project is monitored in the following ways:
- Effectiveness of developed technologies, as measured by:
o The speed and reliability of new validation and verification techniques in identifying known microelectronics issues (e.g. tampering) in laboratory and non-laboratory situations;
o Successful testing of advanced, alternative manufacturing techniques such as disaggregated manufacturing; and
o Resilience of microelectronics protected by new trust approach technologies in red teaming exercises.
- Adoption of next-generation trust technologies, as measured by:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P839 / *New Trust Approach*

o The number of DoD and other Government programs employing these trust technologies, design approaches, or best practices, possibly as facilitated by the provision of use models;
o The volume and criticality of components employing these technologies, design approaches, or best practices; and
o Promulgation in DoD guidance and program protection plans.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605140D8Z / *Trusted Foundry*	Project (Number/Name) P839 / *New Trust Approach*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
New Trust Approach Program Support	MIPR	Various (DARPA, Air Force, Army, Navy, NSA) : Various	-	-		-		47.800	Mar 2017	-		47.800	0.000	47.800	Continuing
		Subtotal	-	-		-		47.800		-		47.800	0.000	47.800	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		47.800		-		47.800	0.000	47.800	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P839 / *New Trust Approach*

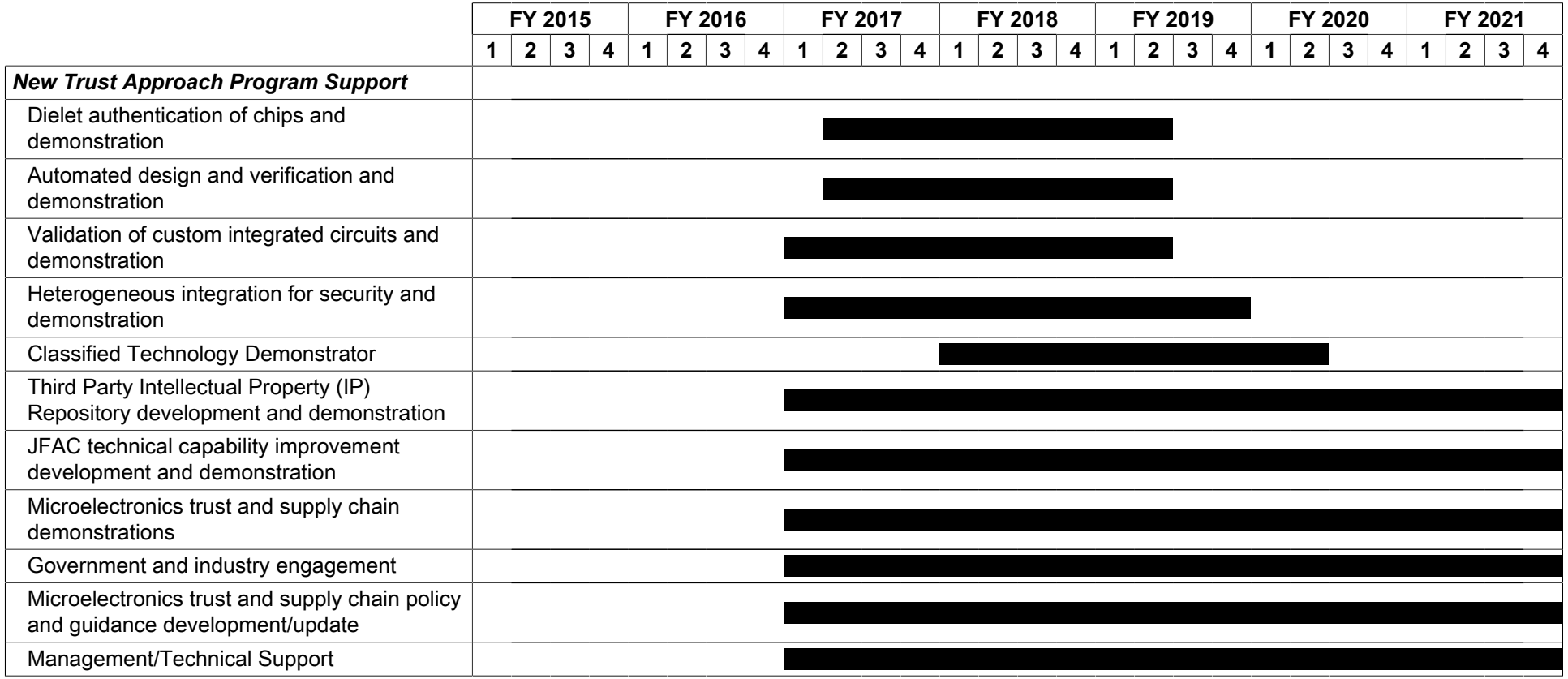

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605140D8Z / *Trusted Foundry*	**Project (Number/Name)** P839 / *New Trust Approach*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
New Trust Approach Program Support				
Dielet authentication of chips and demonstration	2	2017	2	2019
Automated design and verification and demonstration	2	2017	2	2019
Validation of custom integrated circuits and demonstration	1	2017	2	2019
Heterogeneous integration for security and demonstration	1	2017	4	2019
Classified Technology Demonstrator	1	2018	2	2020
Third Party Intellectual Property (IP) Repository development and demonstration	1	2017	4	2021
JFAC technical capability improvement development and demonstration	1	2017	4	2021
Microelectronics trust and supply chain demonstrations	1	2017	4	2021
Government and industry engagement	1	2017	4	2021
Microelectronics trust and supply chain policy and guidance development/update	1	2017	4	2021
Management/Technical Support	1	2017	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	42.000	9.227	7.209	9.881	-	9.881	11.961	10.419	9.947	10.141	Continuing	Continuing
P*021: *Defense-Wide Electronic Procurement Capabilities-Contingency*	42.000	9.227	7.209	9.881	-	9.881	11.961	10.419	9.947	10.141	Continuing	Continuing

Note

The FY 2017 funding request was reduced by $1.517 million to account for the availability of prior year execution balances. Other Reductions include Efficiency reductions and economic adjustments in the amount of $.125M

A. Mission Description and Budget Item Justification

Defense-wide Electronic Procurement Capabilities is designed to provide an avenue for the development of increased e-business capabilities critical to meet the enterprise-wide needs of the procurement community. The requirement for increased e-business capabilities may result from statute, regulation or internal control requirements. This program provides opportunities for the introduction of innovative, time-saving, and cost-saving technologies into procurement processes across the Department. This RDT&E PE provides resources to conduct software development and testing on new or modified e-business applications to ensure mature system development, integration and demonstration of production representative systems and capabilities.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	9.546	7.209	11.562	-	11.562
Current President's Budget	9.227	7.209	9.881	-	9.881
Total Adjustments	-0.319	0.000	-1.681	-	-1.681
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	-			
• SBIR/STTR Transfer	-0.315	-			
• Efficiency Reductions	-	-	-0.037	-	-0.037
• Economic Assumptions	-	-	-0.088	-	-0.088
• Prior Year Balance Adjustment	-	-	-1.517	-	-1.517
• Fiscal Guidance Adjustment	-	-	-0.039	-	-0.039

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605210D8Z *I Defense-Wide Electronic Procurement Capabilities*

Change Summary Explanation

The FY 2017 funding request was reduced by $1.517 million to account for the availability of prior year execution balances. Other Reductions include Efficiency reductions and economic adjustments in the amount of $.125M

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*	Project (Number/Name) P*021 / *Defense-Wide Electronic Procurement Capabilities- Contingency*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P*021: *Defense-Wide Electronic Procurement Capabilities-Contingency*	42.000	9.227	7.209	9.881	-	9.881	11.961	10.419	9.947	10.141	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Defense-wide Electronic Procurement Capabilities is designed to provide an avenue for the development of increased e-business capabilities critical to meet the enterprise-wide needs of the procurement community. The requirement for increased ebusiness capabilities may result from statute, regulation or internal control requirements. This program provides opportunities for the introduction of innovative, time-saving, and cost-saving technologies into procurement processes across the Department. This RDT&E PE provides resources to conduct software development and testing on new or modified e-business applications to ensure mature system development, integration and demonstration of production representative systems and capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense-Wide Electronic Procurement Capabilities- Contingency	9.227	7.209	9.881

FY 2015 Accomplishments:

To mitigate fiscal reductions funding will be focused on the continued development of an end to end paperless reconciliation process for Government Furnished Property (GFP) and to complete implementation of a fraud and misuse data mining detection capability for purchase cards in DoD. These funds will also be used to strengthen existing vendor identification systems in DoD to combat counterfeiting and cyber intrusion. Moderate risk will be taken in reducing efforts to support continued development of contingency contracting and financial management business tools for the warfighter that do not exist, rather funds will focus on improving tools currently in immature development stages, and implement those initiatives/tools in theater. Funds will also focus on developing enterprise mapping capabilities to streamline existing procure to pay exchanges and achieve efficiencies through data standards and auditability in partnership with the Comptroller.

FY 2016 Plans:

To achieve efficiencies and support audit readiness funding will support the following procurement capabilities development: 1) an end to end paperless reconciliation process for Government Furnished Property (GFP) 2) complete implementation of a fraud and misuse data mining detection capability for purchase cards in DoD, 3) strengthening existing vendor identification systems in DoD to combat counterfeiting and cyber intrusion, 4) implementating contingency contracting end to end business tools for the warfighter, 5) developing enterprise mapping capabilities to streamline procure to pay exchanges in partnership with the Comptroller. Low risk adjustments were taken in shifting focus to automating simple contract closeout, and business intelligence

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*	**Project (Number/Name)** P*021 / *Defense-Wide Electronic Procurement Capabilities- Contingency*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
capabilities and to mitigate fiscal reductions. Efficiency Reductions for PB16 were taken along with additional PB16 adjustments to a total of 2.205M from the original President's Budget. ***FY 2017 Plans:*** To achieve efficiencies and support audit readiness funding will support the following procurement capabilities development: 1) an end to end paperless reconciliation process for Government Furnished Property (GFP) 2) continue implementation of a fraud and misuse data mining detection capability for purchase cards in DoD, 3) strengthening existing vendor identification systems in DoD to combat counterfeiting and cyber intrusion, 4) implementing contingency contracting end to end business tools for the warfighter, 5) developing enterprise mapping capabilities to streamline procure to pay exchanges in partnership with the Comptroller.			
Accomplishments/Planned Programs Subtotals	9.227	7.209	9.881

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

NA

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*	Project (Number/Name) P*021 / *Defense-Wide Electronic Procurement Capabilities- Contingency*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Business Systems Development	Various	DLA, JTIC, WPAFB : FORT BELVOIR, SCOTT AFB	41.320	8.277		6.703		9.260		-		9.260	-	-	-
		Subtotal	41.320	8.277		6.703		9.260		-		9.260	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Interoperability Testing	Various	DLA, JTIC, WPAFB : FORT BELVOIR, SCOTT AFB	0.680	0.950		0.506		0.621		-		0.621	-	-	-
		Subtotal	0.680	0.950		0.506		0.621		-		0.621	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	42.000	9.227		7.209		9.881		-		9.881	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*	**Project (Number/Name)** P*021 / *Defense-Wide Electronic Procurement Capabilities- Contingency*

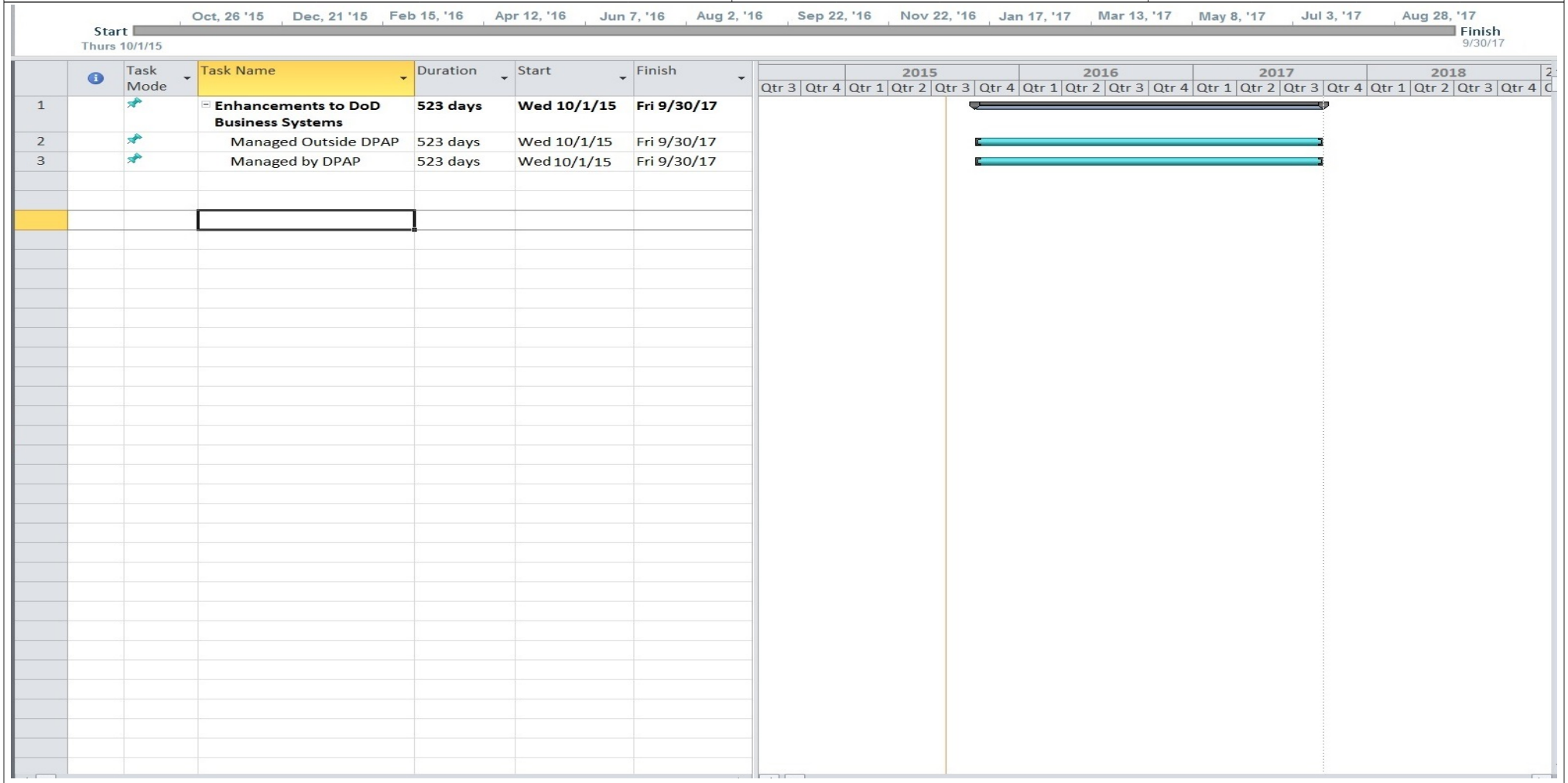

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0605210D8Z / *Defense-Wide Electronic Procurement Capabilities*	**Project (Number/Name)** P*021 / *Defense-Wide Electronic Procurement Capabilities- Contingency*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
N/A				
Enhancements Managed outside of DPAP	1	2017	4	2019
Not Applicable				
Enhancements Managed by DPAP	1	2017	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	6.658	3.538	4.406	2.703	-	2.703	3.839	3.753	3.527	3.598	Continuing	Continuing
304: *Enterprise Energy Information Management*	3.597	0.732	0.799	0.552	-	0.552	0.556	0.535	0.500	0.000	Continuing	Continuing
305: *Real Property Accountability*	3.061	2.806	2.619	1.405	-	1.405	2.230	2.204	2.107	2.640	Continuing	Continuing
306: *Cyber Security*	-	0.000	0.988	0.746	-	0.746	1.053	1.014	0.920	0.958	Continuing	Continuing

A. Mission Description and Budget Item Justification

PE 0305304D8Z was established in FY2013. This PE plays a pivotal role in the Department's ability to achieve audit readiness, and enhance the Department's goal of energy efficiency. The PE helped conduct a full Business Process Re-engineering of the processes used to collect energy information, and publishing an EEIM data standard. Funding is also used to determine requirements for the Department's Real Property inventory records, used to support EEIM's collection of energy data at the real property asset level, as well as to develop and procure an enterprise wide data warehouse that will be integrated with existing and future energy and real property systems. The real property inventory fulfills functions required by executive order and DoD's plans to be "audit ready" by 2017.

In 2015, it was determined that the current state of cyber security of energy-related (and other real property-related) control systems (such as the electronic/computer controls on heating, ventilation & air conditioning equipment) is deficient, and a $1,000,000 increase in FY2016 funding was allocated above the EEIM baseline to support a multi-year real property-related control systems cyber security initiative.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	3.538	4.406	4.545	-	4.545
Current President's Budget	3.538	4.406	2.703	-	2.703
Total Adjustments	0.000	0.000	-1.842	-	-1.842
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Internal Realignment and funding request reduction to account for availability of prior year execution funds.	-	-	-1.805	-	-1.805

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense					Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*		
• Economic Assumptions Adjustment	-	-	-0.026	-	-0.026
• Other Adjustments	-	-	-0.011	-	-0.011

Change Summary Explanation

Funding was realigned to O&M for critical statutory requirements.

Other adjustments are the results of departmental efficiencies reduction

The FY2017 funding request was reduced by $0.688 million to account for the availability of prior year execution funds.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	Project (Number/Name) 304 / *Enterprise Energy Information Management*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
304: *Enterprise Energy Information Management*	3.597	0.732	0.799	0.552	-	0.552	0.556	0.535	0.500	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A key part of DoD's strategy to meet its energy goals is to develop an energy information management environment that will enable the Services and OSD to track energy production and usage across the real property portfolio. Information on energy usage is critical for day-to-day management and accountability, troubleshooting building systems, and planning for capital investments. These funds will support the development and procurement of an enterprise-wide energy data warehouse that will be integrated with existing and future real property systems. AT&L has already conducted a comprehensive requirements analysis for this prospective warehouse using funds provided through the now-disestablished Business Transformation Agency. We have defined a standard set of energy information management requirements and included them in the BEA. We are now developing and procuring an enterprise wide data warehouse that will be integrated with existing and future energy and real property systems. AT&L funding is required to keep this project on track and ensure that the DoD-wide energy management data environment becomes a reality.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Enterprise Energy Information Management	0.732	0.799	0.552
FY 2015 Accomplishments: Funds support the continued development and procurement of an enterprise-wide energy data warehouse that will be integrated with existing and future real property systems.			
FY 2016 Plans: Funds will support the continued development and procurement of an enterprise-wide energy data warehouse that will be integrated with existing and future real property systems.			
FY 2017 Plans: Funds will support the continued development and procurement of an enterprise-wide energy data warehouse that will be integrated with existing and future real property systems.			
Accomplishments/Planned Programs Subtotals	0.732	0.799	0.552

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 304 / *Enterprise Energy Information Management*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	Project (Number/Name) 304 / *Enterprise Energy Information Management*	

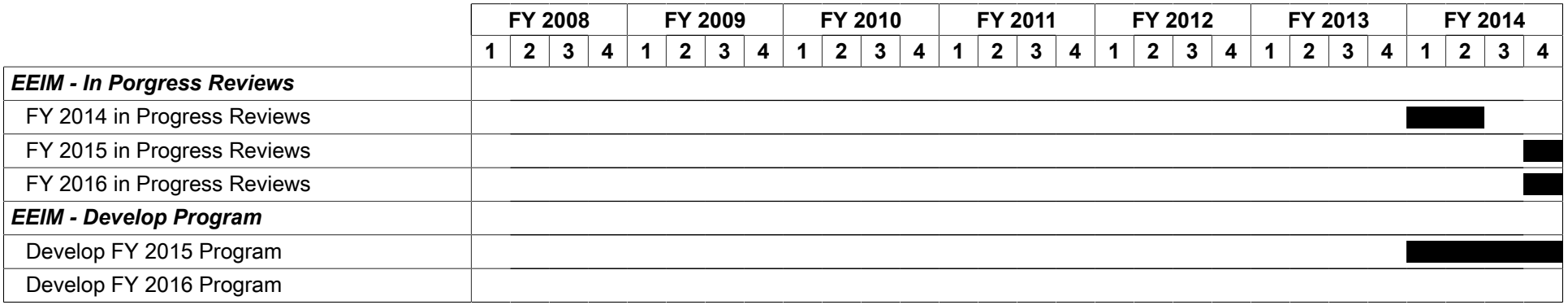
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Contract	Option/ IDDQ	IV&V : Alexandria, VA	3.597	0.732		0.799		0.552		-		0.552	-	-	-
		Subtotal	3.597	0.732		0.799		0.552		-		0.552	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.597	0.732		0.799		0.552		-		0.552	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 304 / *Enterprise Energy Information Management*



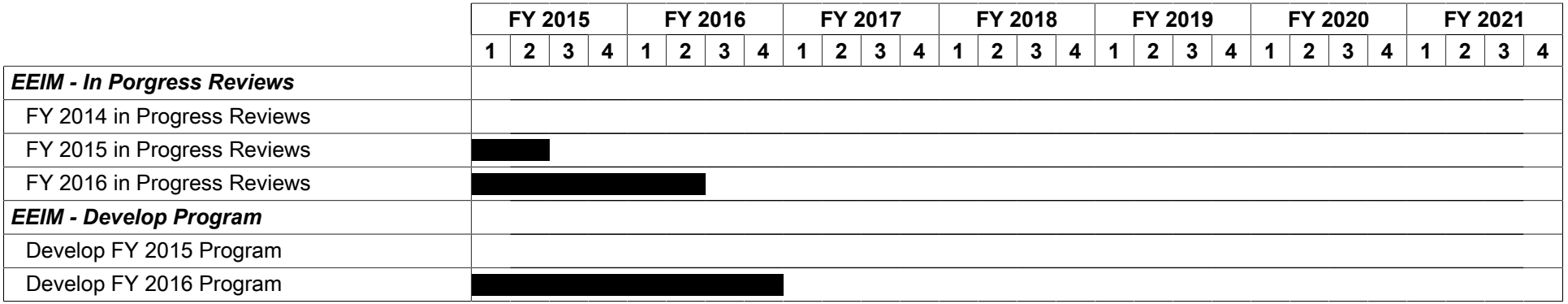


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 304 / *Enterprise Energy Information Management*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EEIM - In Porgress Reviews				
FY 2014 in Progress Reviews	1	2014	2	2014
FY 2015 in Progress Reviews	4	2014	2	2015
FY 2016 in Progress Reviews	4	2014	2	2016
EEIM - Develop Program				
Develop FY 2015 Program	1	2014	4	2014
Develop FY 2016 Program	1	2015	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	Project (Number/Name) 305 / *Real Property Accountability*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
305: *Real Property Accountability*	3.061	2.806	2.619	1.405	-	1.405	2.230	2.204	2.107	2.640	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Real Property inventory fulfills requirements of Executive Order for DOD to achieve and maintain real property accountability. This is critical both from audit readiness and program management perspectives. New policies are in place, but business systems must be modified to support data requirements. This funding is used to determine requirements for the Department's Real Property inventory records as well as to develop and procure an enterprise wide data warehouse that will be integrated with existing and future energy and real property systems. This warehouse will collect, maintain, and report on the inventory and assist the Components to implement inventory requirements, including data accuracy and completeness. Without funding the components will return to services agency centric processes that do not allow for total DOD accountability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Real Property Accountability	2.806	2.619	1.405
FY 2015 Accomplishments: This funding is used to continue to determine requirements for the Department's Real Property inventory records as well as to continue to develop and procure an enterprise wide data warehouse that will be integrated with existing and future energy and real property systems.			
FY 2016 Plans: TBD			
FY 2017 Plans: This funding is used to continue to determine requirements for the Department's Real Property inventory records as well as to continue to develop and procure an enterprise wide data warehouse that will be integrated with existing and future energy and real property systems.			
Accomplishments/Planned Programs Subtotals	2.806	2.619	1.405

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 305 / *Real Property Accountability*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	Project (Number/Name) 305 / *Real Property Accountability*	

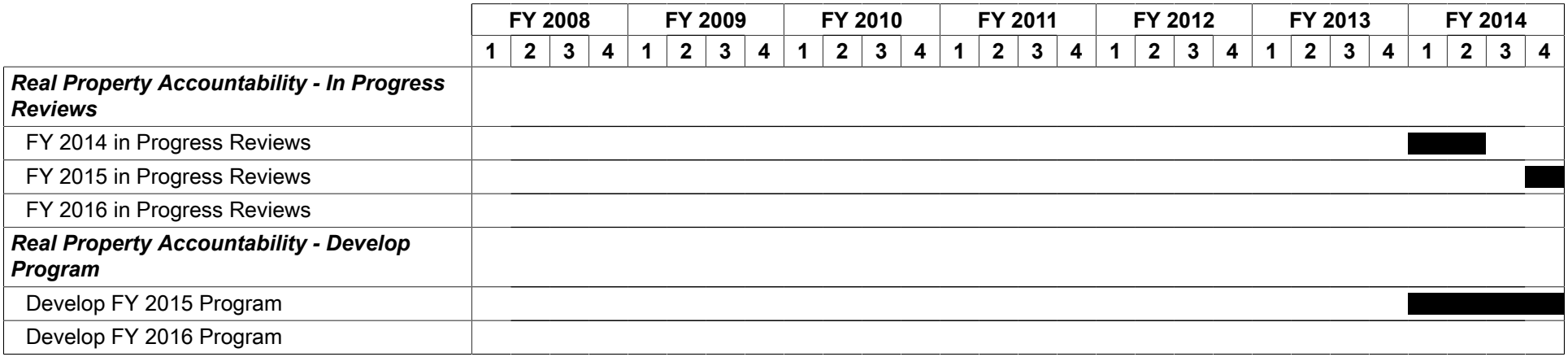
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Contract	C/IDDQ	TRANSCOM : Scott AFB, IL	3.061	2.806		2.619		1.405		-		1.405	-	-	-
		Subtotal	3.061	2.806		2.619		1.405		-		1.405	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.061	2.806		2.619		1.405		-		1.405	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 305 / *Real Property Accountability*



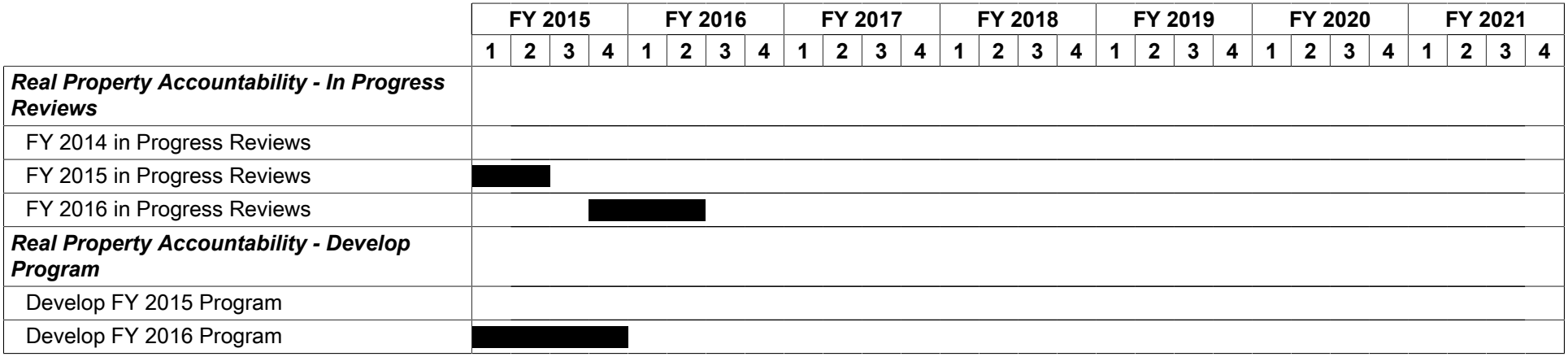


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 305 / *Real Property Accountability*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Real Property Accountability - In Progress Reviews				
FY 2014 in Progress Reviews	1	2014	2	2014
FY 2015 in Progress Reviews	4	2014	2	2015
FY 2016 in Progress Reviews	4	2015	2	2016
Real Property Accountability - Develop Program				
Develop FY 2015 Program	1	2014	4	2014
Develop FY 2016 Program	1	2015	4	2015

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	Project (Number/Name) 306 / *Cyber Security*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
306: *Cyber Security*	-	0.000	0.988	0.746	-	0.746	1.053	1.014	0.920	0.958	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The current state of cyber security of energy-related (and other real property-related) control systems (such as the electronic/computer controls on heating, ventilation & air conditioning equipment) is deficient, and the adjusted EEIM baseline supports a multi-year real property-related control systems cyber security initiative to address these issues.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Cyber Security	0.000	0.988	0.746
Description: The current state of cyber security of energy-related (and other real property-related) control systems (such as the electronic/computer controls on heating, ventilation & air conditioning equipment) is deficient. This effort supports a multi-year real property-related control systems cyber security initiative to address these issues. So far it has generated an updated DoD CIO RMF Knowledge Service Portal with controls systems cyber security implementation guidance for practitioners (templates, key references, step-by-step instructions, look-up tables, etc.) Controls systems cyber security Tactics, Techniques and Procedures (TTPS) has transitioned from Joint Base Architecture for Secure Industrial Control Systems (J-BASICS). The department has begun to implement Platform Resilience Mission Assurance (PRMA) assessments across 10 installations. ***FY 2015 Accomplishments:*** N/A ***FY 2016 Plans:*** Will Support multiyear real property-related controls cyber security systems initiative. ***FY 2017 Plans:*** Will Support multiyear real property-related controls cyber security systems initiative.			
Accomplishments/Planned Programs Subtotals	0.000	0.988	0.746

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 306 / *Cyber Security*

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 306 / *Cyber Security*

Remarks

Will Support multiyear real property-related controls cyber security systems initiative.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 306 / *Cyber Security*

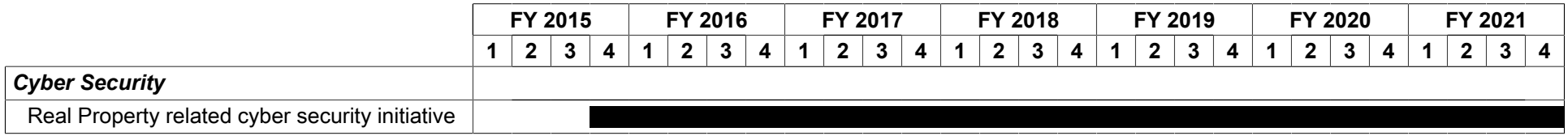


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 5	**R-1 Program Element (Number/Name)** PE 0305304D8Z / *DoD Enterprise Energy Information Management (EEIM)*	**Project (Number/Name)** 306 / *Cyber Security*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Security				
Real Property related cyber security initiative	4	2015	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604774D8Z / *Defense Readiness Reporting System (DRRS)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	18.766	5.605	5.571	4.678	-	4.678	7.135	6.796	6.264	6.385	Continuing	Continuing
774: *Defense Readiness Reporting System (DRRS)*	18.766	5.605	5.571	4.678	-	4.678	7.135	6.796	6.264	6.385	Continuing	Continuing

A. Mission Description and Budget Item Justification

This funding supports Defense Planning Guidance (DPG) directing the Department of Defense (DoD) components to develop guidelines and procedures for a comprehensive readiness reporting system that evaluates readiness on the basis of the actual missions and capabilities assigned to the forces. The Defense Readiness Reporting System (DRRS) establishes a capabilities-based, adaptive, near real-time readiness information system for the DoD. This system is being designed to measure the readiness of military forces and supporting infrastructure to meet missions and goals assigned by the Secretary of Defense. DRRS hosts information and applications used to support the Geographic and Functional Combatant Commanders, the Services, Combat Support Agencies, the Joint Staff and the Office of the Secretary of Defense.

The transformation of readiness reporting into a new, more comprehensive system presents a number of significant challenges. First, there are thousands of new potential reporting entities to include in DRRS, such as Combatant Commands, Joint Task Forces, Services, Active and Reserve component units, installations, depots, ports, and major elements of the industrial base. These entities must not only define and implement reporting based on specific readiness metrics, but they must make their readiness status continuously available in near real time to DRRS. Second, the shift from resource centric readiness reporting to a mission/ capabilities based reporting system oriented towards the National Military Strategy (NMS) makes substantially more complex demands on readiness reporting. DRRS allows the Department to assess readiness globally based on our integrated ability to project and sustain a mix of constructed forces in simultaneous engagements. Finally, the challenges associated with sourcing and evaluating the readiness of our forces engaged in on-going real operations mean that force managers need applications that will query the entire Department for suitable, available organizations to meet current needs. The need for these applications and the underlying data are a top priority for the DRRS project.

The realization of DRRS requires integrating a host of key technologies in order to achieve an information system that supports distributed, collaborative, and dynamic readiness reporting in addition to continuous tool-based assessment. The primary technical goal is the creation of a highly reliable and securely integrated readiness data environment to leverage and extend current readiness information systems. This system is based on intelligent agents, dynamic databases, semantic middleware, and publish/subscribe concepts; providing a logically uniform view into the multiple databases and information sources that feed DRRS. Through this type of advanced information environment, the DRRS dramatically expands the range of readiness information available to manage the force. This environment supports a suite of analysis tools that allow users to explore the consequences of readiness deficiencies in terms of the ability to generate forces and assess transportation feasibility as it pertains to specific scenarios. These tools and tool suites harness the power of the information environment to make possible the kind of quick-turnaround, excursion-driven readiness assessment that is at the heart of DRRS.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604774D8Z *I Defense Readiness Reporting System (DRRS)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	5.607	5.581	6.268	-	6.268
Current President's Budget	5.605	5.571	4.678	-	4.678
Total Adjustments	-0.002	-0.010	-1.590	-	-1.590
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.002	-			
• FFRDC Rdeuction	-	-0.010	-	-	-
• Economic Assumptions Reductions	-	-	-0.029	-	-0.029
• Realignment of funds	-	-	-1.561	-	-1.561

Change Summary Explanation

The FY 2017 funding request was reduced by $1.561 million to account for the availability of prior year execution balances.
The keystone program within the Department's readiness enterprise, DRRS funding has also been adjusted by $0.029 M to accommodate the schedules of interfacing systems.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604774D8Z / *Defense Readiness Reporting System (DRRS)*	Project (Number/Name) 774 / *Defense Readiness Reporting System (DRRS)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
774: *Defense Readiness Reporting System (DRRS)*	18.766	5.605	5.571	4.678	-	4.678	7.135	6.796	6.264	6.385	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding supports Defense Planning Guidance (DPG) directing the Department of Defense (DoD) components to develop guidelines and procedures for a comprehensive readiness reporting system that evaluates readiness on the basis of the actual missions and capabilities assigned to the forces. The Defense Readiness Reporting System (DRRS) establishes a capabilities-based, adaptive, near real-time readiness information system for the DoD. This system is being designed to measure the readiness of military forces and supporting infrastructure to meet missions and goals assigned by the Secretary of Defense. DRRS hosts information and applications used to support the Geographic and Functional Combatant Commanders, the Services, Combat Support Agencies, the Joint Staff and the Office of the Secretary of Defense.

DRRS expands the scope of readiness reporting within the Department to create a more comprehensive assessment of the total force and its capability to perform the tasks and missions required of it to support the National Military Strategy. DRRS allows the Department to assess readiness globally based on our integrated ability to project and sustain a mix of constructed forces in simultaneous engagements. The program is the keystone for the readiness enterprise and architected to embrace the implementation of the Global Force Management - Data Imitative (GFM-DI), allowing for the Department's efforts in the realm of Adaptive Planning and Execution to be fully supported.

The realization of DRRS requires integrating a host of key technologies in order to achieve an information system that supports distributed, collaborative, and dynamic readiness reporting in addition to continuous tool-based assessment. The primary technical goal is the creation of a highly reliable and securely integrated readiness data environment to leverage and extend current readiness information systems. This system is based on intelligent agents, dynamic databases, semantic middleware, and publish/subscribe concepts; providing a logically uniform view into the multiple databases and information sources that feed DRRS. Through this type of advanced information environment, the DRRS dramatically expands the range of readiness information available to manage the force. This environment supports a suite of analysis tools that allow users to explore the consequences of readiness deficiencies in terms of the ability to generate forces and assess transportation feasibility as it pertains to specific scenarios. These tools and tool suites harness the power of the information environment to make possible the kind of quick-turnaround, excursion-driven readiness assessment that is at the heart of DRRS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: 774 Defense Readiness Reporting System	5.605	5.571	4.678
Description: DRRS is the primary means by which Defense components (Combatant Commands, Services, Agencies and their subordinate elements and units) report their readiness. The system measures readiness of the Department's components to execute the full range of missions assigned by the Secretary of Defense.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604774D8Z / *Defense Readiness Reporting System (DRRS)*	**Project (Number/Name)** 774 / *Defense Readiness Reporting System (DRRS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

The Defense Readiness Reporting System (DRRS) establishes a capabilities-based, adaptive, near real-time readiness information system for DoD. DRRS measures the readiness of military forces and supporting infrastructure to meet missions and goals assigned by the Secretary of Defense. The realization of DRRS required integrating a host of key technologies to achieve an information system that supports distributed, collaborative, and dynamic readiness reporting in addition to continuous tool-based assessment. The primary technical goal was the creation of a highly reliable and securely integrated readiness data environment to leverage and extend current readiness information systems. DRRS contains readiness metrics and supporting data for forces and support organizations.

FY 2015 Accomplishments:
- Continue Software lifecycle support
- Continue to assist the Services, CCDRs and Combat Support Agencies fully integrating DRRS
- Continue refinement of data architecture
- Continue full integration of GFM DI within DRRS
- Support the integration of JPES and integration with APEX
- Data quality improvement
- Data latency improvement with the use of Dashboards
- Continue development and integration with Interagency readiness and preparedness systems outside DoD.
- Complete Joint Interoperability testing through the Joint Interoperability Test Command (JITC)

FY 2016 Plans:
- Continue refinement of data architecture
- Continue development and refinement of the Air Force Input Tool
- Continue full integration of GFM DI within DRRS
- Complete development required to support the readiness enterprise transition to DRRS as the source for SORTS data
- Support the integration of JPES and integration with APEX
- Data quality improvement
- Data latency improvement with the use of Dashboards
- Continue development and integration with Interagency readiness and preparedness systems outside DoD.
- Complete Joint Interoperability Testing through the Joint Interoperability Test Command (JITC)

FY 2017 Plans:
- Optimize system implementation within the Defense Enterprise Computation Center environment to include development of functionality need to replace Enterprise Messaging
- Continue full integration of GFM DI within DRRS

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604774D8Z / *Defense Readiness Reporting System (DRRS)*	**Project (Number/Name)** 774 / *Defense Readiness Reporting System (DRRS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Implement functionality to support the needs of the Adaptive Planning and Execution initiatives.			
Accomplishments/Planned Programs Subtotals	5.605	5.571	4.678

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

• Readiness Transformation - Accurate and timely Mission Readiness Assessment and Reporting
• Capability Readiness Reporting and Assessment - Operational commonality of mission based capability readiness reporting and assessment
• DRRS Operational Performance - Single integrated Readiness system capability for the Department
• Achieving Reliable Data Architecture and Interoperability - Seamless integration with the departments readiness architecture and compatible with emerging adaptive planning systems
• Transition to one readiness reporting system for DoD.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604875D8Z / *Joint Systems Architecture Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	10.161	2.986	3.076	4.499	-	4.499	5.080	5.445	5.520	5.628	Continuing	Continuing
P875: *Portfolio Systems Acquisition (PSA)*	10.161	2.986	2.979	4.499	-	4.499	5.080	5.445	5.520	5.628	Continuing	Continuing
P220: *Electronic Warfare Executive Committee*	-	0.000	0.097	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Department and acquisition reform initiatives call for top down, national security strategy-driven capabilities-based planning. Department of Defense (DoD) Instruction 5000.02 and Chairman of the Joint Chiefs of Staff Instruction 3170.01 promulgate capabilities-based requirements and acquisition processes. The JSAD program enables collaborative efforts to achieve these goals with a focus on Major Defense Acquisition Programs (MDAPs). These efforts include warfighting capability-based analyses; assessments of joint capability areas and joint integrating concepts; development of system-related data; integrated roadmaps to support acquisition investment decisions; and assessments of MDAPs in a capability area context. Activities in the JSAD project are divided into three areas: (1) capability-based analysis; (2) roadmaps; and (3) support tools and guidance. Capability-based analysis provides analysis of the different technology, functionality, and integration impacts of systems on warfighting capability. Acquisition roadmaps guide systems development and associated investment plans. JSAD support tools and guidance initiatives develop systems data, and tools, exploit modeling and simulation and architecture efforts to improve DoD's overall assessment capability. These efforts guide the development and improve the testing and fielding of integrated systems of systems in order to achieve Joint mission capabilities. The Department has also undergone an institutional reorientation or shift in emphasis from organization-specific to enterprise-wide approaches. This means: (1) horizontal integration within the Department and unity of effort through greater interagency collaboration; (2) engaging in a coordinated and portfolio-based approach to planning, programming, budgeting and execution; and (3) significant reforms at the governance, management and execution levels. To accomplish this direction, there needs to be a focused goal and concerted emphasis on shifting from systems acquisition to capabilities-based portfolio management (or portfolio systems acquisition). This program enables collaborative efforts to implement the QDR direction outlined above in order to achieve portfolio systems acquisition goals. The program is broken up into two focus areas (Portfolio Management and Reform Initiatives).

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604875D8Z *I Joint Systems Architecture Development*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	3.087	3.081	4.634	-	4.634
Current President's Budget	2.986	3.076	4.499	-	4.499
Total Adjustments	-0.101	-0.005	-0.135	-	-0.135
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-			
• SBIR/STTR Transfer	-0.100	-			
• FY16 FFRDC	-	-0.005	-	-	-
• Efficiency Reductions	-	-	-0.085	-	-0.085
• Economic Assumptions	-	-	-0.035	-	-0.035
• Other Reductions	-	-	-0.015	-	-0.015

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604875D8Z / *Joint Systems Architecture Development*	Project (Number/Name) P875 / *Portfolio Systems Acquisition (PSA)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P875: *Portfolio Systems Acquisition (PSA)*	10.161	2.986	2.979	4.499	-	4.499	5.080	5.445	5.520	5.628	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Departments 2005 Quadrennial Defense Review (QDR) laid out the need for an institutional reorientation or shift in emphasis from organization-specific to enterprise-wide approaches. This meant: (1) horizontal integration within the Department and unity of effort through greater interagency collaboration; (2) engaging in a coordinated and portfolio-based approach to planning, programming, budgeting and execution; and (3) significant reforms at the governance, management and execution levels. The Department's 2010 QDR report further addressed reforming how we buy, noting that the conventional acquisition process is too long and too cumbersome to fit the needs of the many systems that require continuous changes and upgrades - a challenge that will become only more pressing over time. Better Buying Power (BBP) is the implementation of best practices to strengthen the Defense Department's buying power, improve industry productivity, and provide an affordable, value-added military capability to the Warfighter. Launched in 2010, BBP encompasses a set of fundamental acquisition principles to achieve greater efficiencies through affordability, cost control, elimination of unproductive processes and bureaucracy, and promotion of competition. BBP initiatives also incentivize productivity and innovation in industry and Government, and improve tradecraft in the acquisition of services. The Department will improve how it matches requirements with mature technologies, maintains disciplined systems engineering approaches. To accomplish this direction, there needed to be a focused goal and concerted emphasis on shifting from acquisition of individual systems to portfolio management (or portfolio systems acquisition). This program enables collaborative efforts to implement the QDR direction outlined above and advance BBP initiatives to achieve portfolio systems acquisition goals and to develop and implement acquisition reform initiatives.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Portfolio Systems Acquisition (PSA)	2.986	2.979	4.499
Description: The program is broken up into two focus areas (Portfolio Management and Reform Initiatives) and consolidates work previously performed under various other Program Elements.			
FY 2015 Accomplishments: -Continued to support Mission Area Portfolio Assessments and warfare areas to identify portfolio and program synergies, reduce duplication, and identify opportunities for cost savings. -Conducted additional analyses and support implementation of Better Buying Power (BBP) initiatives. -Provided technical expertise in support of warfare area portfolios, including Tactical Air (TACAIR) (e.g., F-35), unmanned systems, electronic warfare, and land warfare and munitions. --Specific research areas included the areas of critical energetics, design for demil, and joint munitions modeling and simulation.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604875D8Z / *Joint Systems Architecture Development*	**Project (Number/Name)** P875 / *Portfolio Systems Acquisition (PSA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
-Assessed progress of program management initiatives and continue support to a variety of certification and qualification standards activities. -Supported research in support of FY15 National Defense Authorization Act (NDAA) report to Congress. -Continued "reliability by design" analyses and support to programs. --Developed initial reliability model to assist in calculating investments needed to reach certain reliability values --Assisted in the development of requirements for G/ATOR radar reliability improvement and 3DELRR radar reliability requirements. --Studied Joint Strike Fighter (JSF) reliability data and growth predictions to support senior leadership DAB preparation. --Studied PKI SIPRNET token reliability problems and made recommendations for way ahead. -Developed DoD courses of action and views on homeland defense implementation and compliance issues in multiple bilateral and multilateral fora. -Updated roadmaps to guide investments in critical areas (e.g., future vertical lift, weapons, and Integrated Air and Missile Defense (IAMD). -Continued analytical support for the IAMD portfolio. -Completed the Modularized Millimeter Wave(MMW) study and fold results into the FY2016 President's Budget Review. -Developed DoD courses of action and views on conventional and strategic arms control treaties implementation and compliance issues in multiple bilateral and multilateral fora. -Provided analytical support to the Homeland Defense Coordinator and DoD-DHS Capability Development Working Group (CDWG) functions within OUSD(AT&L).			
FY 2016 Plans: -Continue and expand support Mission Area Portfolio Assessments and warfare areas to identify portfolio and program synergies, reduce duplication, and identify opportunities for cost savings. -Conduct additional analyses and support implementation of updated Better Buying Power (BBP) initiatives. -Provide technical expertise in support of warfare area portfolios including Tactical Air (TACAIR), unmanned systems, electronic warfare, and land warfare and munitions. -Assess progress of program management initiatives and continue support to a variety of certification and qualification standards activities. -Continue "reliability by design" analyses and support to programs. --Continue radar systems study of G/ATOR and 3DELRR reliability to reduce O&S cost. --Study requirements generation process to develop criteria to help ensure requirements are based on sound physics and understand correct entry points for OSD; goal is reduced test costs and better milestone readiness. --Continue support to programs/initiate new analyses.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604875D8Z / *Joint Systems Architecture Development*	**Project (Number/Name)** P875 / *Portfolio Systems Acquisition (PSA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
-Update roadmaps and where appropriate generate new roadmaps to guide investments in critical areas (e.g., future vertical lift and Integrated Air and Missile Defense (IAMD). -Continue analytical support for the IAMD portfolio. -Provide analysis and support to the Homeland Defense Coordinator and DoD-DHS Capability Development Working Group (CDWG) Executive Secretary functions within OUSD(AT&L). ***FY 2017 Plans:*** -Continue and expand support Mission Area Portfolio Assessments and warfare areas to identify portfolio and program synergies, reduce duplication, and identify opportunities for cost savings. -Conduct additional analyses and support implementation of updated Better Buying Power (BBP) initiatives. -Provide technical expertise in support of warfare area portfolios. -Assess progress of program management initiatives and continue support to a variety of certification and qualification standards activities. -Continue "reliability by design" analyses and support to programs. -Develop DoD courses of action and views on homeland defense implementation and compliance issues in multiple bilateral and multilateral fora. -Provide analytical support to the Homeland Defense Coordinator function within OUSD(AT&L). -Update roadmaps and where appropriate generate new roadmaps to guide investments in critical areas (e.g., future vertical lift, weapons and Integrated Air and Missile Defense (IAMD). -Continue analytical support for the IAMD portfolio. -Provide analysis and support to the Homeland Defense Coordinator and DoD-DHS Capability Development Working Group (CDWG) Executive Secretary functions within OUSD(AT&L).			
Accomplishments/Planned Programs Subtotals	2.986	2.979	4.499

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• P875: *Portfolio Systems Acquistion (PSA)*	2.986	2.979	4.619	0.000	4.619	5.121	5.458	5.563	5.672	Continuing	Continuing

Remarks

D. Acquisition Strategy

Not Applicable

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604875D8Z / *Joint Systems Architecture Development*	**Project (Number/Name)** P875 / *Portfolio Systems Acquisition (PSA)*

E. Performance Metrics

Not Applicable

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604875D8Z / *Joint Systems Architecture Development*	Project (Number/Name) P220 / *Electronic Warfare Executive Committee*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P220: *Electronic Warfare Executive Committee*	-	0.000	0.097	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Electronic Warfare (EW) Executive Committee(EXCOM)- co-chaired by the Under Secretary of Defense for Acquisition, Technology and Logistics and the Vice Chairman of the Joint Chiefs of Staff - is tasked to provide senior oversight, coordination, budget/capability harmonization, and advice on EW matters to the Secretary of Defense, Deputy Secretary of Defense, and the Deputy's Management Action Group. Primary focus areas include EW strategy, acquisition, operational support, and security objectives.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Electronic Warfare Executive Committee	-	0.097	-
Description: Funds are to conduct analytic assessments, threat-projective red-teaming, and physics-based modeling of electronic warfare capabilities to support the Deputy Secretary of Defense-directed Electronic Warfare (EW) Executive Committee (EXCOM). ***FY 2016 Plans:*** - Build analytic underpinning for strategy formulation, acquisition plans, operational support and security.			
Accomplishments/Planned Programs Subtotals	-	0.097	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not Applicable

E. Performance Metrics

Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	509.677	234.011	213.668	219.199	-	219.199	220.566	260.138	263.409	295.914	Continuing	Continuing
940: *Central Test and Evaluation Investment Program (CTEIP)*	509.677	234.011	213.668	219.199	-	219.199	220.566	260.138	263.409	295.914	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Since its inception in FY 1990, this program element has been used to fund the development of critically needed, high priority Test and Evaluation (T&E) capabilities for joint/multi-Service requirements. The Central Test and Evaluation Investment Program (CTEIP) uses a corporate investment approach to combine Service, Defense, and other government agencies T&E needs, maximize opportunities for joint efforts, and avoid unwarranted duplication of test capabilities. CTEIP focuses investments on projects that will have high productivity returns on investment. Projects under the CTEIP Program Element (PE) support two basic tasks: investments to improve the test capabilities base (Joint Improvement and Modernization (JIM) projects) and development of near-term solutions to test capability shortfalls in support of ongoing operational test programs (Resource Enhancement Project (REP)).

The JIM funds critically needed T&E investments in the major functional areas of: air combat; armament and munitions; Command, Control Communication, Computer and Intelligence (C4I) and networks; common range instrumentation; electronic combat; land combat; sea combat; space combat; target systems; and test environments. Examples of project subject matter include: highly accurate time-space-position information, network enhanced telemetry, electronic warfare test capability developments to address critical testing shortfalls against advanced threats, information assurance and cyber testing and analysis capabilities, ground testing for hypersonic systems, and end-to-end testing of infrared countermeasure systems. CTEIP continues as the focal point for fostering common architectures throughout the test and training communities to enhance the sharing of resources and links between test and training ranges.

CTEIP has provided special focus to institutionalize the use of modeling and simulation (M&S) as a practical test tool; to link ranges through internetting to enhance inter-range and inter-Service cooperation and resource sharing; and, to ensure development and acquisition of common instrumentation necessary for a more efficient test infrastructure.

Analyses of alternative solutions are conducted for each investment project to validate T&E requirements, to define integrated support systems, and to determine overall cost effectiveness of the proposed test investments. The use of Department of Defense (DoD)-wide criteria for requirement validation, prioritization, and risk assessment ensures an effective test resource investment program.

The REP funds development of near-term solutions for critical ongoing operational tests supporting decisions on major, high priority defense acquisition programs. These unanticipated operational test (OT) capability requirements arise from several sources such as a new threat system identified during OT planning, acquisition of foreign military assets that are critical in determining weapon system operational effectiveness, short timelines between system design maturity and scheduled OT, and emerging technologies and test requirements resulting from operational concept changes mandated by Congress or Director, Operational Test & Evaluation (DOT&E),

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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or system-of-systems testing. Funding these activities under the CTEIP provides the opportunity to coordinate and integrate these near-term test requirements with the total DoD test and evaluation investment planning, and ensures their availability and legacy for other programs that may have similar testing requirements.

This Budget Activity 6 PE includes special studies, analyses, and strategic planning related to test capabilities and infrastructure, and supports the development and application of proven technologies to provide major test and evaluation capabilities required to meet DoD component weapon system test requirements.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	239.163	229.125	213.559	-	213.559
Current President's Budget	234.011	213.668	219.199	-	219.199
Total Adjustments	-5.152	-15.457	5.640	-	5.640
• Congressional General Reductions	-	-0.457			
• Congressional Directed Reductions	-	-15.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.094	-			
• SBIR/STTR Transfer	-5.058	-			
• Internal Adjustments	-	-	-4.646	-	-4.646
• Departmental Efficiency Adjustment	-	-	-4.220	-	-4.220
• Economic Assumption Reduction	-	-	-1.494	-	-1.494
• Hypersonics	-	-	16.000	-	16.000

Change Summary Explanation

• Strategic efficiency reductions in management headquarters funding and staffing for better alignment and to provide support to a smaller military force.
NOTE: The FY 2016 funding request was reduced by $20.000 million to account for the availability of prior year execution balances.
• Departmental Efficiency Adjustment
• Economic Assumption Reduction
• Development of improved Hypersonics Ground Test capabilities

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Central Test and Evaluation Investment Program	234.011	213.668	219.199
FY 2015 Accomplishments: JIM Projects:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continued concept development and preliminary design for the Advanced Range Tracking and Imaging System project to provide an integrated next generation suite of optical tracking mounts needed to increase performance, reduce costs, and effectively deliver secure reliable optical throughput. - Completed concept development and critical design and initiated system development for the Multi-Level Secure (MLS) Joint/ Coalition Network Environment project to develop a standardized, DoD multi-level secure and cross-domain data management T&E network architecture. - Completed system development for the Joint Unmanned Aircraft Systems (UAS) Mission Environment project to develop a capability for testing UAS in simulated system of systems environments. - Completed initial phase of development flight testing for the Integrated Network Enhanced Telemetry project Block I capability to develop a network-enhanced aeronautical telemetry capability for T&E ranges and facilities. - Continued the Next Generation Range Control and Data Distribution project to enhance and modernize range control and data distribution systems at the Pacific Missile Range Facility (PMRF). - Continued systems development for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - Completed concept development and subsystem-level preliminary design, and initiated system development for the Next Generation Electronic Warfare Environment Generator Build B project to provide electronic warfare simulation capabilities for testing future Electronic Attack and Electronic Support Measures systems. - Completed critical design review of the Subminiature Flight Safety System project to provide a subminiature, low-cost flight termination system with time-space-position information and data link capabilities. - Continued threat system simulator development efforts to improve integration, reduce potential duplication, and ensure that accurate, cost-effective representations of threat systems are available to support testing. - Completed concept development and preliminary design and initiated system development for the Synthetic Battlefield Emitter Systems project to provide a controlled density open air environment for testing of C4ISR systems. - Completed concept development and preliminary design and initiated system development for the Vertical Electromagnetic Pulse (EMP) and High Power Microwave (HPM) Test Sources project to provide vertical high-altitude EMP and HPM external electromagnetic environments for testing in accordance with applicable Military Standards. - Completed concept development and preliminary design, and initiated system development for the Network Centric Weapon (NCW) T&E Environment project to provide an enhanced capability to test and evaluate NCW in a distributed simulation environment. - Continued the Cyber Test Analysis and Simulation Environment project to enhance current Information Assurance / Cyber testing and analysis capabilities and modeling and simulations tools for testing against increasingly robust Cyber threats. - Continued system development for the Radar Signal Emulator project to provide open-loop, transmit-only systems that will accurately emit waveforms of threat radar systems operating in the C and S radio frequency (RF) bands.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continued system development for the Advanced Dynamic Transmitter Array project to develop a signal-dense, complex, dynamic radio frequency (RF) signal threat environment that will accurately represent signal characteristics, increase signal densities, and increase existing Installed System Test Facility (ISTF)-based signal of interest power levels while reducing test system set up and calibration times. - Continued system development for the B-2 Defense Management System to upgrade test capabilities at the Benefield Anechoic Facility (BAF) to support B-2 testing in a modern radio frequency (RF) signal threat environment. - Continued system development of the Closed Loop PESA Simulator project to develop a closed-loop radar system that will closely replicate the performance of a widely fielded Western Pacific (WESTPAC) long-range surface-to-air missile (SAM) system. - Continued system development of Integrated Air Defense System (IADS) Enhancements that will add comprehensive threat-representative IADS capabilities based on the development and integration of several high-priority, threat-representative Command Post (CP) models to open-air test ranges, test laboratories and modeling and simulation (M&S) facilities. - Continued Integrated Technical Evaluation and Analysis of Multiple Sources (ITEAMS) activities to provide detailed analysis and validation of threat system designs and operational techniques. - Continued the Knowledge Management (KM) project to establish a next-generation KM capability that utilizes the latest in virtualization technologies, methodologies, and best practices for efficient and effective use of T&E data. - Continued the Common Development Environment project to combine the specifications, models, tools, policy, and best practices needed to enhance interoperability among live, virtual, and constructive T&E capabilities throughout the acquisition lifecycle. - Initiated concept development for the Commercial Derivative Aircraft Based Instrumentation Telemetry System project to provide expanded capability and capacity telemetry support for aircraft and missile defense testing in inter-range and broad ocean area test scenarios. - Continued system development for the Joint Distributed Infrared Countermeasures (IRCM) Ground Test System project to provide an end-to-end ground test system enabling complete testing of IRCM systems. - Continued risk reduction activities under the Enhanced Solutions Process for potential multi-service T&E developments, as recommended by Service Test and Evaluation Executives. Resource Enhancement Project: - Completed development of Hostile Fire Indicator Site (HFIS) to enhance existing Hostile Fire Indicator test site with key upgrades to fully facilitate HFI testing of hostile fire warning systems. - Completed the Global Positioning System (GPS) High Power Jammer (HPJ) system, which provides additional units and validation to complete GPS jamming threat representation for GPS-guided weapon operational testing purposes. - Completed development of mobile Flight Mission Simulator Advanced Electronic Attack (mFMS-AEA) to emulate threat electronic attack for Patriot flight mission simulators allowing the Army to test air defense radars in electronic attack scenarios.			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Completed development of the Ground Mounted Seeker Simulator (GMSS) system to provide a validated missile seeker-in-the-loop to complement the I-32/34 radar at Naval Air Warfare Center Weapons Division (NAWCWD) Electronic Combat Range. - Completed development of DIADS Weapons Control (DWC) to develop new Integrated Air Defense (IADS) weapons control algorithms in the Digital IADS (DIADS) used in the F-35 Virtual Simulator (VSIM) and other evaluations. - Continued development of C2 and Urban Background Environment Simulator (CUBES) to incorporate modern urban communication background signals and selected closed-loop communications for Installed System Test Facility communications jamming purposes. - Continued development of Boosted Zombie Target (BZT) to develop multi-stage, economical targets for PAC-3 by integrating a GFE booster onto a blue "Zombie" maneuvering target. - Continued the Digital Integrated Air Defense System (DIADS) Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced ECM response features in support of F-35 and F-22 operational testing. - Continued development of Joint Standard Instrumentation Suite (JSIS) to measure and collect signature, time-space-position information (TSPI), and related data of threat missile and hostile fire munitions (e.g., small arms and RPG) firings to support evaluation of the missile/hostile fire warning systems such as the Advance Threat Warning (ATW) system. - Continued the Automated Test Case Generator Web Service (ATC-GEN WS) to provide Joint Interoperability Test Command (JITC) with the capability to develop Ballistic Missile Defense System (BMDS) and Mode 5 IFF MIL-STD-6016E compliance test cases and an automated test tool on a test network. - Continued development of Torpedo Operational Testing Using Modeling and Simulation (TOTUMS) to enhance torpedo OT&E by upgrading an HITL simulator and environment simulator for high-fidelity, OT-ready realism. - Continued development of the Wideband Configurable Control Jammer (WCCJ) Enhancement to develop and integrate an Electronic Support Measures (ESM) direction finding subsystem into WCCJ, thus improving its ability to monitor and prioritize signals during operational test events such as Network Integrated Exercise. - Initiated development of MSALTS Ultraviolet Emitter Enhancement (MUVEE) to upgrade Multi Spectral Sea and Land Target Simulator (MSALTS) with LED-based UV source for short shot hostile fire IRCM end-to-end threat engagements. - Initiated development of Submarine Launched Modular 3-inch Device (SLAM-3D), which provides a Cluster Donut countermeasure emulator that will help resolve the Anti-Submarine Warfare communities of interest (COI) for the Mk 54 Mod 1 Torpedo. - Initiated development of Airborne Early Warning Interoperability Simulator (AEIS) to develop the hardware and software necessary to generate a properly spaced, dense target and ECM environment for injection-mode Installed Systems Test Facility testing of the E-2D Hawkeye mission system. - Initiated development of Advanced Mine Simulation System (AMISS) Upgrade, which provides the existing AMISS asset with five new mine triggering emulations, as well as sensor and improved compartmentalization enhancements.			
FY 2016 Plans:			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
JIM Projects: - Complete concept development and preliminary design and initiate system development for the Advanced Range Tracking and Imaging System project to provide an integrated next generation suite of optical tracking mounts needed to increase performance, reduce costs, and effectively deliver secure reliable optical throughput. - Continue the Next Generation Range Control and Data Distribution project to enhance and modernize range control and data distribution systems at the Pacific Missile Range Facility (PMRF). - Continue system development for the Multi-Level Secure (MLS) Joint/Coalition Network Environment project to develop a standardized, DoD multi-level secure and cross-domain data management T&E network architecture. - Continue system development of the Integrated Network Enhanced Telemetry project Block I capability to develop a network-enhanced aeronautical telemetry capability for T&E ranges and facilities. - Complete system development and initiate transition to production and sustainment for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - Continue system development for the Next Generation Electronic Warfare Environment Generator Build B project to provide electronic warfare simulation capabilities for testing future Electronic Attack and Electronic Support Measures systems. - Continue threat system simulator development efforts to improve integration, reduce potential duplication, and ensure that accurate, cost-effective representations of threat systems are available to support testing. - Continue system development for the Synthetic Battlefield Emitter Systems project to provide a controlled density open air environment for testing of C4ISR systems. - Complete system development for the Vertical Electromagnetic Pulse (EMP) and High Power Microwave (HPM) Test Sources project to provide vertical high-altitude EMP and HPM external electromagnetic environments for testing in accordance with applicable Military Standards. - Continue the Network Centric Weapon (NCW) T&E Environment project to provide an enhanced capability to test and evaluate NCW in a distributed simulation environment. - Continue the Cyber Test Analysis and Simulation Environment project to enhance current Information Assurance / Cyber testing and analysis capabilities and modeling and simulations tools for testing against increasingly robust Cyber threats. - Continue system development for the Radar Signal Emulator project to provide open-loop, transmit-only systems that will accurately emit waveforms of threat radar systems operating in the C and S radio frequency (RF) bands. - Continue system development for the Advanced Dynamic Transmitter Array project to develop a signal-dense, complex, dynamic radio frequency (RF) signal threat environment that will accurately represent signal characteristics, increase signal densities, and increase existing Installed System Test Facility (ISTF)-based signal of interest power levels while reducing test system set up and calibration times. - Complete system development for the B-2 Defense Management System to upgrade test capabilities at the Benefield Anechoic Facility (BAF) to support B-2 testing in a modern radio frequency (RF) signal threat environment.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue system development of the Closed Loop PESA Simulator project to develop a closed-loop radar system that will closely replicate the performance of a widely fielded Western Pacific (WESTPAC) long-range surface-to-air missile (SAM) system. - Continue system development of Integrated Air Defense System (IADS) Enhancements that will add comprehensive threat-representative IADS capabilities based on the development and integration of several high-priority, threat-representative Command Post (CP) models to open-air test ranges, test laboratories and modeling and simulation (M&S) facilities. - Continue Integrated Technical Evaluation and Analysis of Multiple Sources (ITEAMS) activities to provide detailed analysis and validation of threat system designs and operational techniques. - Continue concept development and preliminary design for the Commercial Derivative Aircraft Based Instrumentation Telemetry System project to provide expanded capability and capacity telemetry support for aircraft and missile defense testing in inter-range and broad ocean area test scenarios. - Continue system development for the Joint Distributed Infrared Countermeasures (IRCM) Ground Test System project to provide an end-to-end ground test system enabling complete testing of IRCM systems. - Complete the Knowledge Management (KM) project to establish a next-generation KM capability that utilizes the latest in virtualization technologies, methodologies, and best practices for efficient and effective use of T&E data. - Continue the Common Development Environment project to combine the specifications, models, tools, policy, and best practices needed to enhance interoperability among live, virtual, and constructive T&E capabilities throughout the acquisition lifecycle. - Continue risk reduction activities under the Enhanced Solutions Process for potential multi-service T&E developments, as recommended by Service Test and Evaluation Executives. - Initiate and complete requirements development and planning, and initiate concept development and preliminary design for the Advanced Weapons Effects Test Capability project to develop a capability to more accurately measure fragment characteristics of explosive weapons and more accurately estimate collateral damage distances. - Initiate and complete requirements development and planning, and initiate concept development and preliminary design for the Mid-Pressure Arc Heater project to expand the H2 Hypersonic Test Facility at Arnold Air Force Base, TN to provide higher enthalpy at the mid-pressure altitudes to enable ground testing of Prompt Global Strike, Maneuvering Reentry Vehicles (MaRV), and SCRamJet components. - Initiate and complete requirements development and planning, and initiate concept development and preliminary design for the Pulsed Neutron Environment project to provide a Low Enriched Uranium (LEU) facility to replace the current HEU reactor, providing higher fluence over a larger test area. It will also develop a Dense Plasma Focus (DPF) system to meet short pulse requirements necessary for both weapons certification and testing new circuit designs. - Initiate and complete requirements development and planning, and initiate concept development and preliminary design for the Radar Cross Section Range Relevance Project to upgrade radar cross section measurement capabilities and test capability at the Atlantic Test Range, Patuxent River NAS and the National RCS Test Facility, Holloman AFB, NM. - Initiate and complete requirements development and planning, and initiate concept development and preliminary design for the Swarm Autonomy and Scoring project to upgrade existing High Speed Maneuverable Surface Target (HSMST) with semi-			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
autonomous control, develop a Real Time Casualty Assessment capability, and improved scoring capabilities for testing against representative surface swarming threats. Resource Enhancement Project: - Complete development of C2 and Urban Background Environment Simulator (CUBES) to incorporate modern urban communication background signals and selected closed-loop communications for Installed System Test Facility communications jamming purposes. - Complete the Wideband Configurable Control Jammer (WCCJ) Enhancement to develop and integrate an Electronic Support Measures (ESM) direction finding subsystem into WCCJ, thus improving its ability to monitor and prioritize signals during operational test events such as Network Integrated Exercise. - Complete the Automated Test Case Generator Web Service (ATC-GEN WS) to provide Joint Interoperability Test Command (JITC) with the capability to develop BMDS and Mode 5 IFF MIL-STD-6016E compliance test cases and an automated test tool on a test network. - Complete development of Torpedo Operational Testing Using Modeling and Simulation (TOTUMS) to enhance torpedo OT&E by upgrading an HITL simulator and environment simulator for high-fidelity, OT-ready realism. - Complete development of Advanced Mine Simulation System (AMISS) Upgrade, which provides the existing AMISS asset with five new mine triggering emulations, as well as sensor and improved compartmentalization enhancements. - Complete development of MSALTS Ultraviolet Emitter Enhancement (MUVEE) to upgrade Multi Spectral Sea and Land Target Simulator (MSALTS) with LED-based UV source for short shot hostile fire IRCM end-to-end threat engagements. - Continue the Digital Integrated Air Defense System (DIADS) Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced ECM response features in support of F-35 and F-22 operational testing. - Continue development of Boosted Zombie Target (BZT) to develop multi-stage, economical targets for PAC-3 by integrating a GFE booster onto a blue "Zombie" maneuvering target. - Continue development of Joint Standard Instrumentation Suite (JSIS) to measure and collect signature, TSPI, and related data of threat missile and hostile fire munitions (e.g., small arms and RPG) firings to support evaluation of the missile/hostile fire warning systems such as the Advance Threat Warning (ATW) system.- Continue development of Submarine Launched Modular 3-inch Device (SLAM-3D), which provides a Cluster Donut countermeasure emulator that will help resolve the Anti-Submarine Warfare COI for the Mk 54 Mod 1 Torpedo. - Continue development of Airborne Early Warning Interoperability Simulator (AEIS) to develop the hardware and software necessary to generate a properly spaced, dense target and ECM environment for injection-mode Installed Systems Test Facility testing of the E-2D Hawkeye mission system. ***FY 2017 Plans:*** JIM Projects:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Complete the Next Generation Range Control and Data Distribution project to enhance and modernize range control and data distribution systems at the Pacific Missile Range Facility (PMRF). - Continue system development for the Advanced Range Tracking and Imaging System project to provide an integrated next generation suite of optical tracking mounts needed to increase performance, reduce costs, and effectively deliver secure reliable optical throughput. - Complete system development for the Synthetic Battlefield Emitter Systems project to provide a controlled density open air environment for testing of C4ISR systems. - Continue system development for the Joint Distributed Infrared Countermeasures (IRCM) Ground Test System project to provide an end-to-end ground test system enabling complete testing of IRCM systems. - Complete system development for Block 1 and continue Block 2 concept development and preliminary design for the Multi-Level Secure (MLS) Joint/Coalition Network Environment project to develop a standardized, DoD multi-level secure and cross-domain data management T&E network architecture. - Continue concept development and preliminary design for the Commercial Derivative Aircraft Based Instrumentation Telemetry System project to provide expanded capability and capacity telemetry support for aircraft and missile defense testing in inter-range and broad ocean area test scenarios. - Continue the Cyber Test Analysis and Simulation Environment project to enhance current Information Assurance / Cyber testing and analysis capabilities and modeling and simulations tools for testing against increasingly robust Cyber threats. - Continue transition to production and sustainment for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - Continue the Network Centric Weapon (NCW) T&E Environment project to provide an enhanced capability to test and evaluate NCW in a distributed simulation environment. - Continue system development for the Next Generation Electronic Warfare Environment Generator Build B project to provide electronic warfare simulation capabilities for testing future Electronic Attack and Electronic Support Measures systems. - Continue system development for the Radar Signal Emulator project to provide open-loop, transmit-only systems that will accurately emit waveforms of threat radar systems operating in the C and S radio frequency (RF) bands. - Continue system development for the Advanced Dynamic Transmitter Array project to develop a signal-dense, complex, dynamic radio frequency (RF) signal threat environment that will accurately represent signal characteristics, increase signal densities, and increase existing Installed System Test Facility (ISTF)-based signal of interest power levels while reducing test system set up and calibration times. - Continue system development of the Closed Loop PESA Simulator project to develop a closed-loop radar system that will closely replicate the performance of a widely fielded Western Pacific (WESTPAC) long-range surface-to-air missile (SAM) system. - Continue system development of Integrated Air Defense System (IADS) Enhancements that will add comprehensive threat-representative IADS capabilities based on the development and integration of several high-priority, threat-representative Command Post (CP) models to open-air test ranges, test laboratories and modeling and simulation (M&S) facilities.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue Integrated Technical Evaluation and Analysis of Multiple Sources (ITEAMS) activities to provide detailed analysis and validation of threat system designs and operational techniques. - Complete concept development and preliminary design and initiate system development for the Advanced Weapons Effects Test Capability project to develop a capability to more accurately measure fragment characteristics of explosive weapons and more accurately estimate collateral damage distances. - Complete concept development and preliminary design and initiate system development for the Mid-Pressure Arc Heater project to expand the H2 Hypersonic Test Facility at Arnold Air Force Base, TN to provide higher enthalpy at the mid-pressure altitudes to enable ground testing of Prompt Global Strike, Maneuvering Reentry Vehicles (MaRV), and SCRamJet components. - Complete concept development for Aerodynamic and Propulsion Test unit. - Complete concept development and preliminary design and initiate system development for the Pulsed Neutron Environment project to provide a Low Enriched Uranium (LEU) facility to replace the current HEU reactor, providing higher fluence over a larger test area. It will also develop a Dense Plasma Focus (DPF) system to meet short pulse requirements necessary for both weapons certification and testing new circuit designs. - Complete concept development and preliminary design and initiate system development for the Radar Cross Section Range Relevance Project to upgrade radar cross section measurement capabilities and test capability at the Atlantic Test Range, Patuxent River NAS and the National RCS Test Facility, Holloman AFB, NM. - Complete concept development and preliminary design and initiate system development for the Swarm Autonomy and Scoring project to upgrade existing High Speed Maneuverable Surface Target (HSMST) with semi-autonomous control, develop a Real Time Casualty Assessment capability, and improved scoring capabilities for testing against representative surface swarming threats. - Continue system development of the Integrated Network Enhanced Telemetry project capability to develop a network-enhanced aeronautical telemetry capability for T&E ranges and facilities. - Continue risk reduction activities under the Enhanced Solutions Process for potential multi-service T&E developments, as recommended by Service Test and Evaluation Executives. - Continue threat system simulator development efforts to improve integration, reduce potential duplication, and ensure that accurate, cost-effective representations of threat systems are available to support testing. - Continue the Common Development Environment project to combine the specifications, models, tools, policy, and best practices needed to enhance interoperability among live, virtual, and constructive T&E capabilities throughout the acquisition lifecycle. - Initiate development of improved hypersonics ground test capabilities to address critical shortfalls in developmental and operational testing of cruise missile and boost glide vehicles. Resource Enhancement Project: - Complete the Digital Integrated Air Defense System (DIADS) Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced ECM response features in support of F-35 and F-22 operational testing.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604940D8Z / *Central Test and Evaluation Investment Program (CTEIP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Complete development of Boosted Zombie Target (BZT) to develop multi-stage, economical targets for PAC-3 by integrating a GFE booster onto a blue "Zombie" maneuvering target. - Complete development of Joint Standard Instrumentation Suite (JSIS) to measure and collect signature, TSPI, and related data of threat missile and hostile fire munitions (e.g., small arms and RPG) firings to support evaluation of the missile/hostile fire warning systems such as the Advance Threat Warning (ATW) system. - Complete development of Submarine Launched Modular 3-inch Device (SLAM-3D), which provides a Cluster Donut countermeasure emulator that will help resolve the Anti-Submarine Warfare COI for the Mk 54 Mod 1 Torpedo. - Complete development of Airborne Early Warning Interoperability Simulator (AEIS) to develop the hardware and software necessary to generate a properly spaced, dense target and ECM environment for injection-mode Installed Systems Test Facility testing of the E-2D Hawkeye mission system.			
Accomplishments/Planned Programs Subtotals	234.011	213.668	219.199

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

A portion of CTEIP projects that were developed and delivered to the DoD test community over the past five years.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604942D8Z / *Assessments & Evaluations*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	6.770	15.220	28.618	28.706	-	28.706	30.375	31.862	32.212	32.840	Continuing	Continuing
P805: *Assessments & Evaluations*	6.770	15.220	28.618	28.706	-	28.706	30.375	31.862	32.212	32.840	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP at (703) 697-1282.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	15.639	28.674	29.576	-	29.576
Current President's Budget	15.220	28.618	28.706	-	28.706
Total Adjustments	-0.419	-0.056	-0.870	-	-0.870
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.006	-			
• SBIR/STTR Transfer	-0.413	-0.056			
• Economic Assumptions Adjustment	-	-	-0.226	-	-0.226
• Departmental Efficiency Adjustment	-	-	-0.545	-	-0.545
• Other Adjustments	-	-	-0.099	-	-0.099

Change Summary Explanation

None.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604942D8Z / *Assessments & Evaluations*	Project (Number/Name) P805 / *Assessments & Evaluations*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P805: *Assessments & Evaluations*	6.770	15.220	28.618	28.706	-	28.706	30.375	31.862	32.212	32.840	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP at (703) 697-1282.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Assessments & Evaluations	15.220	28.618	28.706	0.000	28.706
Description: Classified Program ***FY 2015 Accomplishments:*** Information is Classified. Program content and funding was moved to this Program Element to effect efficiencies and increase oversight. Program was reduced by Congress due to growth. ***FY 2016 Plans:*** Program change from fee-for-service to fully organically funding drives the increase in funding requested. Detailed information is Classified. ***FY 2017 Base Plans:*** Detailed information is Classified. ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	15.220	28.618	28.706	0.000	28.706

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This is a RDT&E Management and Support effort and does not acquire any products.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0604942D8Z / *Assessments & Evaluations*	**Project (Number/Name)** P805 / *Assessments & Evaluations*

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	58.761	26.736	40.146	87.080	-	87.080	94.868	90.626	87.325	83.385	Continuing	Continuing
100: *Joint Mission Environment Test Capability Distributed Test*	48.761	16.455	20.494	66.267	-	66.267	73.920	68.689	64.895	59.796	Continuing	Continuing
200: *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*	10.000	10.281	19.652	20.813	-	20.813	20.948	21.937	22.430	23.589	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Mission Environment Test Capability (JMETC) program was established for the purpose of implementing the Department's strategy to move to an enterprise-centric, distributed test capability that results in acquisition systems fielded with enhanced joint capabilities, reduced program costs, and improved acquisition timelines. The JMETC program implements the infrastructure capabilities defined in the Department of Defense's "Testing in a Joint Environment Roadmap" to provide acquisition program managers a robust nation-wide capability to "test like we fight." JMETC provides a persistent, distributed test and evaluation (T&E) capability; supporting system development, interoperability testing, and cyber testing; that otherwise would not be readily available to Service/Component acquisition programs. The JMETC program is funded within the Research, Development, Test and Evaluation (RDT&E) Management Support Budget Activity because it is intended to provide test capability in support of RDT&E programs. By linking distributed facilities, JMETC allows acquisition programs to efficiently evaluate their warfighting capability in a realistic joint mission environment. This enables a customer-defined joint mission test environment for systems engineering and testing, extensible to training and experimentation, in a timely and cost effective manner.

On October 1, 2012, the Under Secretary Defense for Acquisition, Technology and Logistics (USD(AT&L)) directed Test Resource Management Center (TRMC) to take responsibility for operations and resources of the National Cyber Range (NCR). TRMC undertook management oversight of the NCR, including all operational activities and sustainment of resources, transitioning it from a Defense Advanced Research Projects Agency (DARPA) Science & Technology project to an operational capability supporting cyber test, experimentation, and training events. The NCR mission is to provide secure facilities, technology, processes, and workforce to rapidly create hi-fidelity, mission representative cyberspace environments and facilitate integration/federation of cyberspace T&E infrastructure in support of the TRMC Mission. In FY-15 the NCR demonstrated robust operational capability supporting 30 different events for a diverse set of customers including US Cyber Command, Joint Staff J-7, Director, Operational Test & Evaluation (DOT&E) and US Naval Air Systems Command (NAVAIR). The NCR was critical to the successful execution of CyberFlag 15-1, CyberGuard 15-1, 15-2 and 15-3. In second quarter FY 2015 the NCR team executed the first Cybersecurity Table Top Exercise for the P-8A Poseidon Maritime Surveillance Aircraft assisting in their planning requirements for their Developmental Test & Evaluation (DT&E) events. In FY 2015, the demand for NCR in support of Operational, Testing and Training Customers has increased significantly. The NCR is supporting current military operations and is preparing to conduct an event in support of ongoing operational contingencies. The NCR has conducted Cyber Mission Force Exercise, Training and Certification Events in support of US Cyber Command including Pacific Sentry, Cyber Knight and Cyber Flag 15-1. The NCR has executed several events in support of Major Defense Acquisition Program (MDAP) and Major Automated Information System (MAIS) Acquisition Programs not limited to and including the Army Command Post Computing Environment (CP CE), the Air Force Joint Space Operations Center (JSpOC) Mission Space (JMS) Program and the Navy P-8A Poseidon, Triton MQ-4C and Tactical Mobile (TACMobile) Programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*

In addition, in FY 2015 an Engineering Change Proposal (ECP) was awarded to evaluate options to replace End of Service/End of Life Rack Servers and Upgrade Storage Components and reassess Risk Management Framework (RMF) Controls to Assess and Authorize the NCR in FY 2016. Additional NCR capacity will be added in FY 2016 and FY 2017 to support increasing demand from both the Testing and Training Communities.

Increased funding in FY 2016 will be used to expand capacity for cyber test and training. The strategy for accomplishing this is three fold: 1) refurbish the NCR hardware, thus increasing compute and storage capacity; 2) purchase and install additional Regional Service Delivery Points (RSDPs), thus increasing capacity for cyber testing; and 3) begin construction of a new high capacity cyber range, similar to the NCR thus increasing capacity for cyber test and training.

The Test Resource Management Center (TRMC) is the Department's lead for the JMETC program, the National Cyber Range, and oversees both their development and operations. TRMC will use the increased funding for FY 2017 to significantly increase cyber test capability by significantly increasing NCR computing capability using a distributed methodology. TRMC will also pursue increased computing power for JMETC, further increasing DoD cyber test capability. These actions will provide increased capacity for cyber testing with added cyber event support to the experimentation and training communities. In addition, TRMC will use a portion of these funds to increase vulnerability assessment capability for DoD systems.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	27.124	45.235	47.163	-	47.163
Current President's Budget	26.736	40.146	87.080	-	87.080
Total Adjustments	-0.388	-5.089	39.917	-	39.917
• Congressional General Reductions	-	-0.089			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.011	-			
• SBIR/STTR Transfer	-0.377	-			
• Internal Adjustment	-	-	1.240	-	1.240
• Departmental Efficiency Adjustment	-	-	-0.978	-	-0.978
• Economic Assumption Reduction	-	-	-0.345	-	-0.345
• National Cyber Range (NCR)	-	-	40.000	-	40.000

Change Summary Explanation

- Internal strategic efficiency reductions in management headquarters funding and staffing for better alignment and to provide support to a smaller military force.
- Departmental Efficiency Adjustment
- Economic assumption reduction
- National Cyber Range (NCR) expansion to address increases in cyber test requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	Project (Number/Name) 100 / *Joint Mission Environment Test Capability Distributed Test*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
100: *Joint Mission Environment Test Capability Distributed Test*	48.761	16.455	20.494	66.267	-	66.267	73.920	68.689	64.895	59.796	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The JMETC mission is to provide an enterprise-level, persistent capability for linking distributed facilities, enabling Department of Defense (DoD) customers to develop and test warfighting capabilities in a Joint Context. JMETC provides a test infrastructure consisting of the components necessary to conduct Joint distributed test events by cost-effectively integrating live, virtual, and constructive (LVC) test resources that are configured to support the users' needs. The JMETC program provides its customers a support team to assist with JMETC products and the conduct of distributed testing. JMETC's institutional funding builds, maintains, and operates the JMETC infrastructure and pays for persistent availability of national connectivity for testing; data communications middleware; identification and development of interface standards; common software tools and components; and a reuse repository. JMETC Program funding also provides JMETC program management, facilities, equipment, operating costs, and special studies and analysis related to distributed test capabilities and infrastructure. Key attributes of the JMETC include: persistency; interoperability; reuse; various combinations of distributed capabilities (reconfigurable infrastructure to meet customer requirements); modeling and simulation (M&S) linkage; Live-Virtual-Constructive (LVC) test resource integration; and distributed test support to satisfy both Service and Joint needs. System engineering, training, and experimentation all benefit from a corporate JMETC developed for T&E. JMETC has grown from four sites in 2007 to 77 sites, 12 peering points to other networks, and an additional 12 planned sites. JMETC will reduce the cost and time to plan and prepare for distributed joint testing by providing a readily-available, persistent connectivity with network security accreditation support, common integration software for linking sites, and accredited test tools for distributed testing. To support its customers, JMETC also provides extensive expertise in planning, preparing for, and executing the infrastructure for distributed test events. In the past year, JMETC has used this expertise and infrastructure to support over 65 customer events.

Additionally in FY 2013, the JMETC PE was funded to develop and build the Regional Service Deliver Points (RSDP). The RSDPs are a set of distributed computing and storage platforms designed to efficiently meet DoD capacity and capability demands for distributed and cyber test and evaluation (T&E) requirements as part of the Test Resource Management Center (TRMC). They provide services (i.e. traffic generation, simulation, instrumentation, visualization, and integrated event management), a scalable architecture to increase capacity and capabilities as needed by the user community, a flexible and adaptable infrastructure to support users requirements which are prone to frequent change, and to deliver cost and performance efficiencies (virtualization, rapid reconstitution). At a high-level architecture view, the RSDP adds enterprise compute and storage resources as well as a platform for distributed and cyber T&E tools and services at multiple classifications necessary to create high fidelity, operationally representative virtual environments, previously unavailable.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Mission Environment Test Capability Distributed Test	16.455	20.494	66.267
FY 2015 Accomplishments: - Continued to provide distributed test support for major customer events such as the Joint Tactical Networking Center (JTNC), Joint Reference Implementation Laboratory (JRIL), MQ-4C Triton, Army Integrated Air and Missile Defense (AIAMD), Joint			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 100 / *Joint Mission Environment Test Capability Distributed Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Interoperability Tests (JITs), AGILE Fire, NAVAIR Integrated Warfare Capability (IWC), and numerous smaller test activities, as well as, continuous interconnectivity between distributed test resources for day-to-day exchange of test data. - Continued planning support to new and on-going acquisition programs including: Program Executive Office, Intelligence, Surveillance, and Sensor Systems (PEO IEW&S) (multiple programs), F-35, Small Diameter Bomb (SDB) II, MQ-4C Triton,P-8A Poseidon, Advanced Anti-Radiation Guided Missile (AARGM), Integrated Defensive Electronic Countermeasures (IDECM), Unmanned Carrier Launched Airborne Surveillance & Strike (UCLASS), Common Aviation Command and Control System (CAC2S, Joint Space Operations Center (JSpOC) Mission Space (JMS), Tactical Mobile (TacMobile), and Marine Corps Tactical Operations Center (CoC). - Continued strategic planning efforts to engage new acquisition programs that must demonstrate compliance with Net-Ready Key Performance Parameter (NR-KPP) and Cyber security requirements. - Continued coordination efforts to integrate DoD/Service/Industry/Academia distributed test and evaluation infrastructure to the JMETC infrastructure. - Continued the planning, alignment, and coordination to establish and improve the test infrastructure for cyber tests and assessments by leveraging other TRMC investments (i.e., Central Test and Evaluation Investment Program (CTEIP) and Test & Evaluation/Science & Test (T&E/S&T) and capabilities of existing cyber ranges (DoD/Services/Industry/Academia). - Continued to assist customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. Continued providing remote and on-site support for the planning and execution of distributed events. - Initiated the implementation of distributed test infrastructure enhancements that support multiple, concurrent classifications up to and including TS//SCI with a focus on leveraging the RSDP capabilities and incorporating both kinetic (weapon systems) and non-kinetic (cyber weapons) assets to address growing interoperability and cyber T&E requirements.			
FY 2016 Plans: - Use additional funding to purchase more Regional Service Deliver Points (RSDPs), thus increasing cyber test capacity. Improve RSDP performance by automating processes, developing in-line encryption capability for Type I encryption, and developing tools to automate exchange of environments between ranges. - Continue to provide distributed interoperability and cyber test support for major customer events such as the F-35 Joint Strike Fighter, Apache Block III testing, Small Diameter Bomb II tests, Advanced Anti-Radiation Guided Missile, MQ-4C Triton testing,			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 100 / *Joint Mission Environment Test Capability Distributed Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
JIAMDO project testing, Joint Interoperability Tests (JITS) for DISA's Joint Interoperability Test Command, Air Force AGILE Fire VIII, NAVAIR Integrated Warfare Capability (IWC) test events, NAVSEA Advanced Mid-Term Interoperability Improvement Program events, Marine Corps Virtual Rapid Prototyping Laboratory (VRPL) experiments, five Air Force Interoperability Tests (AFSIT), and numerous smaller test activities. - Continue planning support to new and on-going acquisition programs including: Program Executive Office, Intelligence, Surveillance, and Sensor Systems (PEO IEW&S) (multiple programs), Mobile User Objective System, Joint Strike Fighter, Small Diameter Bomb (SDB) II, MQ-4C Triton,P-8A Poseidon, Advanced Anti-Radiation Guided Missile (AARGM), Integrated Defensive Electronic Countermeasures (IDECM), Unmanned Carrier Launched Airborne Surveillance & Strike (UCLASS), Common Aviation Command and Control System (CAC2S, Joint Space Operations Center (JSpOC) Mission Space (JMS), Tactical Mobile (TacMobile), and Marine Corps Tactical Operations Center (CoC). - Continue strategic planning efforts to engage new acquisition programs that must demonstrate compliance with Net-Ready Key Performance Parameter (NR-KPP) and Cyber security requirements. - Continue to assist customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. Continue providing remote and on-site support for the planning and execution of distributed events. - Continue the planning, alignment, and coordination to establish and improve the test infrastructure for cyber tests and assessments by leveraging other TRMC investments (i.e. CTEIP and T&E/S&T) and capabilities of existing cyber ranges (DoD/ Services/Industry/Academia). - Increase cyber test capacity by speeding up acquisition of Regional Service Delivery Points (RSDPs), acquire additional storage capacity for the RSDPs, and develop a central library for blue and red environments to promote reuse. Fulfill implementation of distributed test infrastructure enhancements that will support multiple, concurrent classifications up to and including TS//SCI and provide for connectivity to coalition partners. ***FY 2017 Plans:*** - TRMC will employ the increased funding in FY 2017 to significantly increase cyber test capability in the Department. TRMC plans to distribute this computing power to serve a distributed test community. By the end of FY 17, TRMC will have significantly increased NCR-like capability, compared to the 2015 NCR computing power, to meet growing demand for cyber test capability. Additionally, TRMC will enhance JMETC computing power further enhancing the ability to meet the full T&E community needs for both interoperability and cyber test capability. In addition, TRMC will use a portion of these funds to increase vulnerability assessment capability for DoD systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 100 / *Joint Mission Environment Test Capability Distributed Test*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Increase cyber test capacity through acquisition of Regional Service Delivery Points (RSDPs). Acquire additional storage capacity for the RSDPs and implement a central library for blue and red environments to promote reuse. Complete development of in-line Type one encryption capability to secure data at rest (in storage). Promote infrastructure for a quick-reaction cyber test capability. Sustain distributed test infrastructure enhancements that will support multiple, concurrent classifications up to and including TS//SCI and provide for connectivity to coalition partners. - Continue to provide distributed interoperability and cyber test support for major customer events such as the F-35 Joint Strike Fighter, Small Diameter Bomb II tests, MQ-4C Triton testing, JIAMDO project testing, Joint Interoperability Tests (JITS) for DISA's Joint Interoperability Test Command, Air Force AGILE Fire IX, NAVAIR Integrated Warfare Capability (IWC) test events, NAVSEA Advanced Mid-Term Interoperability Improvement Program events, Marine Corps Virtual Rapid Prototyping Laboratory (VRPL) experiments, five Air Force Interoperability Tests (AFSIT), and numerous smaller test activities. - Continue planning support to new and on-going acquisition programs including: Program Executive Office, Intelligence, Surveillance, and Sensor Systems (PEO IEW&S) (multiple programs), Mobile User Objective System, Advanced Anti-Radiation Guided Missile (AARGM), Integrated Defensive Electronic Countermeasures (IDECM), Unmanned Carrier Launched Airborne Surveillance & Strike (UCLASS), Common Aviation Command and Control System (CAC2S), Joint Space Operations Center (JSpOC) Mission Space (JMS), Tactical Mobile (TacMobile), and Marine Corps Tactical Operations Center (CoC). - Continue strategic planning efforts to engage new acquisition programs that must demonstrate compliance with Net-Ready Key Performance Parameter (NR-KPP) and Cyber security as part of their Survivability KPP requirements. - Continue to assist customers with the use of distributed test tools and troubleshooting of the end-to-end network infrastructures. Continue providing remote and on-site support for the planning and execution of distributed events. - Continue the planning, alignment, and coordination to establish and improve the test infrastructure for cyber tests and assessments by leveraging other TRMC investments (i.e. CTEIP and T&E/S&T) and capabilities of existing cyber ranges (DoD/ Services/Industry/Academia).			
Accomplishments/Planned Programs Subtotals	16.455	20.494	66.267

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 100 / *Joint Mission Environment Test Capability Distributed Test*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Number of Distributed test sites
- Number of events conducted
- Number of acquisition programs supported

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 200 / *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
200: *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*	10.000	10.281	19.652	20.813	-	20.813	20.948	21.937	22.430	23.589	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2013, responsibility for the National Cyber Range (NCR) was given to the Test Resource Management Center (TRMC) and subsequently aligned under the Joint Mission Environment Test Capability (JMETC) Program Element. The NCR was funded in FY 2013 through funds provided by Defense Advanced Research Projects Agency (DARPA), Director, Operational Test & Evaluation (DOT&E), Assistant Secretary of Defense (Research & Engineering)(ASD(R&E)) reprogramming, and the TRMC investment programs. In FY 2014, the NCR was funded from the JMETC Program Element. The NCR provides secure facilities, technology, processes, and workforce to rapidly create hi-fidelity, mission representative cyberspace environments and facilitate integration/federation of cyberspace test and evaluation (T&E) infrastructure in support of the TRMC Mission. It supports a diverse user base and accommodates a wide variety of event types (R&D, Developmental Test & Evaluation (DT&E), Operational Test & Evaluation (OT&E), Security Control Assessor (SCA) Compliance, Defensive Cyber Operations (DCO), Offensive Cyber Operations (OCO), Tactics, Techniques Procedures (TTP) Development, Forensics/Malware Analysis) and communities (research, systems engineering, testing, operations, training, etc.). The NCR has the capability to support up to 4 concurrent events at different classification levels using Multiple Independent Levels of Security (MILS) architecture. It is accredited to operate at TS//SI-G/TK/HCS-P//SAR. In support of a variety of customers, the NCR has emulated complex (Red/Blue/Gray) operationally representative network environments at a scale up to ~40K virtual nodes. The NCR can operate in conjunction with other ranges through remote connectivity via Joint Information Operations Range (JIOR) and JMETC connectivity infrastructure. The NCR's Test Automation Tools minimize human error, enable verification of test environment, ensure repeatable results and can reduce event timelines from weeks/months to hours/days. Range assets can be sanitized after exposure to malicious attacks/ malware to restore exposed systems to a known, clean state.

The Cyberspace Environments provisioned at the NCR support multiple customers with testing and training objectives including Research and Development, Science and Technology, Systems engineering, Test and Evaluation and training and experimentation. The NCR enables acquisition programs to conduct Cybersecurity Test and Evaluation (T&E) in a representative Cyberspace Environment to identify and close exposed vulnerabilities, evaluate resiliency and positively impact program cost, schedule and performance. The NCR also supports Training and Certification of Cyber Mission Forces in support of US Cyber Command by enabling operational forces to efficiently evaluate cyber warfighting capability in a realistic joint mission environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Mission Environment Test Capability NCR Sustainment	10.281	19.652	20.813
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 200 / *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- The OPTEMPO at the NCR has been extremely high with the completion of more than 32 events. The NCR utilization exceeded 100% of the originally provisioned capacity by adding standalone test beds. More than 50% of range operations have supported the Training Community with the remainder supporting the Testing Community with some time allocated for software and hardware maintenance. - TRMC operated the NCR in support of growing Acquisition Program Cybersecurity Test and Evaluation needs. The NCR supported test planning and execution for MDAP and MAIS acquisition programs including Navy MQ-4C TRITON, P-8A Poseidon, Army Command Post Computing Environment and Air Force Joint Space Operations Center Mission Systems (JMS). The NCR supported other DoD organizations providing cyber test capability to agencies such as Army Intelligence and Information Warfare Directorate; Office of Naval Intelligence; Cost Assessment and Program Evaluation (CAPE); Director Operational Test and Evaluation; and the Army Communications and Electronics Research, Development and Engineering Command (CERDEC). - NCR provided support for USCC Training and Certification Events by developing red and gray environments for Cyber Flag 15-1 and multiple Cyber Knight and Cyber Guard Events. The NCR also supported JS-J6/DOT&E sponsored Enterprise Cyber Range Environment events. - NCR provided planning support for real world operations and supported in the preparations to conduct an event to address ongoing operational contingencies. - NCR Test Directors and Red Team provided cyber T&E planning support to acquisition programs such as Triton, TacMobile and P-8 to help programs address cyber security as early as possible in development. - TRMC executed an Engineering Change Proposal (ECP) to develop Engineering Plans to enhance the NCR capabilities and processes to support increasing demand from the testing and training communities. The ECP identified engineering improvements needed to increase computing capacity, mass storage and software tools to support increased demand. The ECP developed a plan to modify the NCR's Test Specification Tool to make it interoperable with other cyber ranges. The ECP also developed engineering plans for technical refresh of the End of Life hardware components to increase capacity. The ECP developed plans to expand the capability to support up to 8 concurrent events using the MILS architecture and scale up to ~250K virtual nodes. Finally, the NCR Team conducted site visits and site surveys to evaluate alternative government sites to build out new NCR Capacity. ***FY 2016 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 200 / *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- NCR will continue to operate in support of the growing Acquisition Program Cybersecurity Test and Evaluation requirements. Continue support of test planning and execution for MDAP and MAIS acquisition programs that have already executed events at the NCR including Navy MQ-4C TRITON, P-8A Poseidon, Army Command Post Computing Environment and Air Force Joint Space Operations Center Mission Systems (JMS). New programs testing at the NCR include CVN-78 and the Presidential Aircraft Remodernization Program. The NCR will continue to support other DoD organizations providing cyber test capability to agencies such as Army Intelligence and Information Warfare Directorate; Office of Naval Intelligence; Cost Assessment and Program Evaluation (CAPE); Director Operational Test and Evaluation; and the Army Communications and Electronics Research, Development and Engineering Command (CERDEC). - NCR will provide support for USCC Training and Certification Events by developing red and gray environments for including Cyber Flag 16 and multiple Cyber Knight and Cyber Guard Events. NCR will continue to support to the JS-J6/DOT&E sponsored Enterprise Cyber Range Environment events as appropriate. The NCR will also begin to build out dedicated Persistent Testing Environment to support DOT&E Sponsored Combatant Command (COCOM) Evaluations. - NCR will respond when requested to support current operations and help address ongoing operational contingencies. - NCR Test Directors and Red Team will provide cyber T&E planning support to acquisition programs such as CVN 78, F-35 Joint Strike Fighter, and Enterprise GPS to help programs address cyber security as early as possible in development. - Increased funding will be used to execute an ECP to expand capacity for cyber test and training. Funding will be used to enhance NCR capabilities and processes to expand the capability to support up to 8 concurrent events at using the MILS architecture and scale up to ~250K virtual nodes. NCR will implement engineering plans developed in FY 2015 for technical refresh of the hardware in the current NCR to increase capacity, reassess Risk Management Framework (RMF) Controls to Assess and Authorize the NCR in FY 2016. Concurrently the NCR will increase computing capacity and upgrade mass storage and software tools to support increased demand. NCR will implement modifications in the NCR's Test Specification Tool to make it interoperable with other cyber ranges. - Increased Funding will be used to build out a government facility that will house a second NCR like capability. ***FY 2017 Plans:*** - The NCR will continue to operate in support of the growing Acquisition Program Cybersecurity Test and Evaluation requirements. The NCR will support test planning and execution for MDAP and MAIS acquisition programs.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605100D8Z / *Joint Mission Environment Test Capability (JMETC)*	**Project (Number/Name)** 200 / *Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- The NCR will provide support for USCC Training and Certification Events by developing red and gray environments for including Cyber Flag and multiple Cyber Knight and Cyber Guard Events. NCR will support to the JS-J6/DOT&E sponsored Enterprise Cyber Range Environment events as appropriate. NCR will begin to build out additional dedicated Persistent Testing and Training Environments to support testing and training customers. - The NCR will provide cyber T&E planning support to acquisition programs to help programs address cyber security as early as possible in development. - The NCR will respond when requested to support current operations and help address ongoing operational contingencies. - The NCR will implement improvements needed to increase capacity to support increased demand at the existing NCR location and build out a government facility to house a second NCR like capability if resources become available.			
Accomplishments/Planned Programs Subtotals	10.281	19.652	20.813

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Number of events conducted
- Utilization rate
- Number of acquisition programs supported
- Number of events supported for other DoD communities

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	85.152	23.735	24.887	23.069	-	23.069	23.040	27.267	27.288	27.199	Continuing	Continuing
P421: *Technical Studies*	85.152	23.735	24.887	23.069	-	23.069	23.040	27.267	27.288	27.199	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is a key source of funding for the Office of the Secretary of Defense and the Joint Staff to manage studies, analysis, management, and technical support efforts to improve and support policy development, decision making, management and administration of DoD programs and activities. Studies and analyses will examine current and alternative policies, plans, operations, strategies and budgets, providing essential means for managing and responding to the shifting and complex international, political, technological, economic, military, and acquisition environments in which national security planning decisions are made. Independent analyses from subject matter experts are instrumental for senior defense planners in making informed choices regarding requirements for force planning and strategic deployment of assets taking into account technological challenges and resource constraints, and there is a strong need to incorporate the findings of operational analysis in force planning requirements and projections. With the complexities of security threats in the current geopolitical environment, the need for objective analysis and forward looking planning in the face of global conflict for the mid and long-term is vital.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	24.466	24.936	25.863	-	25.863
Current President's Budget	23.735	24.887	23.069	-	23.069
Total Adjustments	-0.731	-0.049	-2.794	-	-2.794
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	0.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	-			
• SBIR/STTR Transfer	-0.727	-			
• General budget reductions	-	-	-2.174	-	-2.174
• General FFRDC reduction	-	-0.049	-	-	-
• Reductions for sevices efficiencies	-	-	-0.438	-	-0.438
• Reductions for economic assumptions	-	-	-0.182	-	-0.182

Change Summary Explanation

Reductions are reflected for implementation of efficiencies initiatives and revised economic assumptions

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605104D8Z *I Technical Studies Support and Analysis*

As part of the Department of Defense reform agenda, the budget estimate reflects a stable long-term trend in the number and cost of reports and studies in the near-term.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / *Technical Studies Support and Analysis*	Project (Number/Name) P421 / *Technical Studies*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P421: *Technical Studies*	85.152	23.735	24.887	23.069	-	23.069	23.040	27.267	27.288	27.199	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program is a key source of funding for the Office of the Secretary of Defense and the Joint Staff to manage studies, analysis, management, and technical support efforts to improve and support policy development, decision making, management and administration of DoD programs and activities. Studies and analyses will examine current and alternative policies, plans, operations, strategies and budgets, providing essential means for managing and responding to the shifting and complex international, political, technological, economic, military, and acquisition environments in which national security planning decisions are made. Independent analyses from subject matter experts are instrumental for senior defense planners in making informed choices regarding requirements for force planning and strategic deployment of assets taking into account technological challenges and resource constraints, and there is a strong need to incorporate the findings of operational analysis in force planning requirements and projections. With the complexities of security threats in the current geopolitical environment, the need for objective analysis and forward looking planning in the face of global conflict for the mid and long-term is vital.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Technical Studies and Analyses Support for the Office of the Secretary of Defense	23.735	24.887	23.069

FY 2015 Accomplishments:

Technical Support for the USD(Acquisition, Technology & Logistics):
Studies and analyses of:

Joint warfighting capability and technology planning, strategic and conventional platform mission assurance, weapons system reliability, autonomous systems, aviation propulsion sustainability, space and airborne portfolio architectures, countering strategic threats, industrial base capabilities assessments and sustainment of design capabilities, cyber operational requirements, defense manufacturing technology, acquisition policy effectiveness, global defense industry trends, technologies for evolving mission requirements, allied defense and logistics capabilities, DoD installations planning, software sustainment infrastructure, electronic warfare, NATO policy planning, international armaments cooperation, identifying acquisition program risk, support to several Defense Science Board task forces on various evolving technological and policy issues, small business investment and acquisition strategy, and sustaining small business research and development capabilities

Technical Support for the Director, Cost Assessment and Program Evaluation:
Studies and analyses regarding the following areas:

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*	**Project (Number/Name)** P421 / *Technical Studies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Strategic tradeoffs and risk management, maintaining force readiness, contingency planning, personnel force models, nuclear readiness, assessments in support of scenario analyses, cyber posture, naval warfare requirements, effectiveness of fighter aircraft service life extension programs, technical studies and analyses to support independent cost estimates and economic research, mobility capabilities, comparative analyses of alternative strategic and conventional weapons systems configurations and force levels, and continuation of development of critical management instruments for measuring the long-term trends, strength and affordability of the defense program Technical Support for the USD(Policy): Studies, analyses, and activities in the following areas: Regional and strategic defense posture, cyber domain awareness, international defense policy planning, deterrence and counterproliferation requirements, NATO requirements planning, space and cyber strategic guidance planning, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers Technical Support for the USD(Personnel & Readiness): Studies and analyses in the following areas: Active and reserve recruiting and retention issues, compensation and legacy costs, incentives for critical positions, optimizing civilian transitions for military personnel, maintaining officer candidate sources, forecasting the impacts of and the development of mitigation strategies for potential force drawdowns, education benefit efficiency, reserve component readiness and sustainability, maintaining a drug-free force, and total force cost analyses Technical Support for the Joint Staff conducting joint research with OSD: Studies and analyses with OSD addressing force architecture, operational scenarios, personnel recovery, cyber capabilities, training requirements, infrastructure requirements, countering anti-access environments, force programming planning and basing requirements			
FY 2016 Plans: Technical Support for the USD(Acquisition, Technology & Logistics): Studies and analyses of: Joint warfighting command and control, strategic and conventional system technologies, naval force structure planning, cyber risk assessments, weapons of mass destruction force protection capabilities, vertical lift force sustainment, strategic deterrence			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*	**Project (Number/Name)** P421 / *Technical Studies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
capabilities, industrial base capabilities assessments, cyber operational requirements, defense manufacturing technology, acquisition policy effectiveness, global defense industry trends, technologies for evolving mission requirements, allied defense capabilities, strategic basing requirements, logistics supply chain and energy requirements, NATO policy planning, munitions safety, identifying acquisition program risk, and support to Defense Science Board task forces on various evolving technological and warfare issues. Technical Support for the Director, Cost Assessment and Program Evaluation: Studies and analyses regarding the following areas: Requirements regarding investment and resource planning such as strategic tradeoffs and risk management, maintaining force readiness, personnel force models, assessments in support of scenario analyses, special operations and force support requirements, technical studies and analyses to support independent cost estimates and economic research, comparative analyses of alternative strategic and conventional weapons systems configurations and force levels, and continuation of development of critical management instruments for measuring the long-term trends, strength and affordability of the defense program Technical Support for the USD(Policy): Studies, analyses, and activities in the following areas: Requirements regarding geopolitical posture and policy such as regional and strategic defense policy planning, catastrophe response planning, deterrence and counterproliferation requirements, scenario-based escalation dynamics analyses, strengthening security assistance mechanisms, international defense trade and industrial relationships, NATO requirements planning, technological and cyber effects on strategic requirements, information operations capabilities, strategic force modernization options, preserving capabilities for stability operations, countering emerging terrorist development, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers Technical Support for the USD(Personnel & Readiness): Studies and analyses in the following areas: Requirements for sustaining and planning for the force of the future such as active and reserve recruiting and retention issues, compensation analyses, improving strategic readiness, improvements to training capabilities, harnessing advances in modeling and simulation in force planning and development, reserve component readiness and sustainability, military family and educational issues, gender and equal opportunity, and strategies for managing the Total Force portfolio			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*	**Project (Number/Name)** P421 / *Technical Studies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Technical Support for the Joint Staff conducting joint research with OSD: Joint Studies and analyses with OSD based upon operational lessons learned, mobility capabilities, supply chain requirements, training requirements, cyber assurance, homeland defense, force programming planning, and basing requirements ***FY 2017 Plans:*** Technical Support for the USD(Acquisition, Technology & Logistics): Studies and analyses of: Technical areas such as joint warfighting capability and technology planning, strategic and conventional system technologies, counter WMD defense capabilities, space portfolio architectures, industrial base capabilities assessments, cyber operational requirements, defense manufacturing technology, acquisition policy effectiveness, global defense industry trends, technologies for evolving mission requirements, allied defense capabilities, strategic basing requirements, DoD installations planning, logistics supply chain and energy requirements, NATO policy planning, treaty compliance requirements, identifying acquisition program risk, support to Defense Science Board task forces on various evolving technological and warfare issues, small business investment and acquisition strategy, the effectiveness of the Small Business Innovation Research (SBIR) program, and DoD contracting policies toward small businesses Technical Support for the Director, Cost Assessment and Program Evaluation: Studies and analyses regarding the following areas: Requirements regarding investment and resource planning such as strategic tradeoffs and risk management, maintaining force readiness, personnel force models, assessments in support of scenario analyses, special operations and force support requirements, technical studies and analyses to support independent cost estimates and economic research, comparative analyses of alternative strategic and conventional weapons systems configurations and force levels, and continuation of development of critical management instruments for measuring the long-term trends, strength and affordability of the defense program Technical Support for the USD(Policy): Studies, analyses, and activities in the following areas: Requirements regarding national security geopolitical posture and policies such as regional and strategic defense strategy, international defense policy planning, strategic force requirements, homeland defense and humanitarian response capabilities, deterrence and counterproliferation requirements, international defense trade and industrial relationships, NATO requirements			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*	**Project (Number/Name)** P421 / *Technical Studies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
planning, technological and other external effects on strategic requirements, space and cyber strategic guidance planning, contingency and stability operations, countering emerging terrorist threats, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers Technical Support for the USD(Personnel & Readiness): Studies and analyses in the following areas: Requirements regarding sustainment and planning for the force of the future such as active and reserve recruiting and retention issues, compensation analyses, identifying critical personnel requirements, reserve component readiness and sustainability, military family and educational issues, gender and equal opportunity, and strategies for managing the Total Force portfolio Technical Support for the Joint Staff conducting joint research with OSD: Joint Studies and analyses with OSD based upon operations research, command and control, mobility capabilities, supply chain requirements, training requirements, homeland defense, force programming planning, and basing requirements			
Accomplishments/Planned Programs Subtotals	23.735	24.887	23.069

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

FY 2017 BA: $23.069 FY 2017 BA Assoc w/Metrics: $23.069 Percent FY 2017 BA Assoc w/Metrics: 100%

This program conducts approximately seventy-five actions per fiscal year to support a wide variety of national security goals of the Department and is designed to encourage a collaborative research approach among the components of OSD and the Joint Staff. The research and study projects supported by this program are closely integrated with the strategic goals of the Department of Defense. The focus of studies varies across a wide spectrum including weapons systems cost analysis, strengthening and leveraging alliances, human resource and military personnel management, examination of innovative technologies, application of technology to operational doctrine, and many other issues of emerging importance. Most of the actions are long to intermediate-range in outlook, and the program allows

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605104D8Z / *Technical Studies Support and Analysis*	**Project (Number/Name)** P421 / *Technical Studies*

organizational leaders to plan and guide their research toward meeting their highest-priority goals and other high-level guidance such as executive branch performance management objectives, the Quadrennial Defense Review, the President's National Security Strategy, and the National Military Strategy of the United States of America.

In following the program efficiencies guidance of the Secretary of Defense, the scope of studies and analyses has been limited as necessary in order to focus upon issues of the highest strategic importance to the Department of Defense while continuing to make every effort to support requirements for the Office of the Secretary of Defense developing from legislative direction.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605117D8Z / *Foreign Materiel Acquisition and Exploitation*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	46.911	46.781	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
411: *Foreign Materiel Acquisition and Exploitation*	46.911	46.781	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding transferred to the Air Force in FY 2016.

A. Mission Description and Budget Item Justification

The Foreign Materiel Acquisition and Exploitation program manages the acquisition and assessment of foreign weapons systems, military equipment and military/dual-use technologies for the military services and defense agencies.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	46.781	0.000	0.000	-	0.000
Current President's Budget	46.781	0.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Change Summary Explanation

Funding transferred to the Air Force in FY 2016.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Foreign Materiel Acquisition and Exploitation	46.781	0.000	0.000
FY 2015 Accomplishments: Mission Support (Details provided in Defense-Wide classified book).			
FY 2016 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605117D8Z *I Foreign Materiel Acquisition and Exploitation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Funding transferred to the Air Force in FY 2016. ***FY 2017 Plans:*** Funding transferred to the Air Force in FY 2016.			
Accomplishments/Planned Programs Subtotals	46.781	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Details provided in Defense-Wide classified book.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605128D8Z / *Classified Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	287.255	99.960	115.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
128: *Classified Program*	287.255	99.960	115.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Classified

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	100.000	0.000	0.000	-	0.000
Current President's Budget	99.960	115.000	0.000	-	0.000
Total Adjustments	-0.040	115.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	115.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.040	-			
• SBIR/STTR Transfer	-	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: 128: *Classified Program*		
Congressional Add: *Classified*	99.960	115.000
Congressional Add Subtotals for Project: 128	99.960	115.000
Congressional Add Totals for all Projects	99.960	115.000

Change Summary Explanation

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605128D8Z / *Classified Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016
Congressional Add: Classified ***FY 2015 Accomplishments:*** Classified Program ***FY 2016 Plans:*** Classified	99.960	115.000
Congressional Adds Subtotals	99.960	115.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

None

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	116.205	43.248	39.581	32.429	-	32.429	38.400	37.952	37.645	38.384	Continuing	Continuing
P142: *Systems Engineering*	98.151	33.516	35.025	28.789	-	28.789	33.915	33.469	33.093	33.742	Continuing	Continuing
P143: *Program Protection*	13.048	4.397	4.556	3.640	-	3.640	4.485	4.483	4.552	4.642	Continuing	Continuing
P241: *Systems Engineering Research Center*	5.006	5.335	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) establishes the dedicated funding line to carry out the duties as described in Title 10 US Code, Section 139, the Weapons Systems Acquisition Reform Act of 2009. The Deputy Assistant Secretary of Defense for Systems Engineering (DASD(SE)) is the principal advisor to the Secretary of Defense, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) and the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) on systems engineering, development planning, program protection and related technical fields in the Department of Defense (DoD). The DASD(SE) develops policies and guidance for (1) the use of systems engineering principles and best practices; (2) the use of systems, system security and software engineering planning and contracting approaches to enhance manufacturing, reliability, availability, maintainability, and software and hardware assurance, on major defense acquisition programs (MDAPs) and major automated information systems (MAISs); (3) the systems engineering plans (SEPs) and program protection plans (PPPs) for MDAPs and MAISs including software, and systems engineering considerations in support of lifecycle management and sustainability; and (4) the inclusion of provisions relating to systems engineering, assurance and reliability in requests for proposals. The DASD(SE) develops new methods, processes, and tools (MPTs) incorporating state of the practice into system engineering for the DoD in both weapon system design, and design tools. The DASD(SE) reviews and approves the SEP and PPP for each MDAP and MAIS, and monitors and reviews the systems engineering, program protection and development planning activities of MDAPs and other defense acquisition programs, as directed by the Secretary of Defense or the USD(AT&L). Based on the DASD(SE)'s continuous program engagement, the DASD(SE) advises and makes recommendations to the Secretary of Defense and the USD(AT&L) regarding systems engineering, development planning, program protection and the execution of these activities. As a member of the Defense Acquisition Board (DAB), the DASD(SE) provides independent assessments of defense acquisition program's systems engineering, development planning, program protection planning, technical execution, and risk. The DASD(SE) also provides input on the inclusion of systems engineering requirements as part of the Joint Requirements Oversight Council's process for joint military requirements, to include developing specific inputs relating to each capabilities development document.

The DASD(SE) issues guidance to, and consults with, the Services and Agencies with respect to systems engineering across the Department. DASD(SE) improves DoD's SE capabilities through advocacy, oversight, policy and guidance in: acquisition workforce responsible for Engineering, and Production, Quality & Manufacturing (PQM); Engineering Tools and Environments; and Specialty Engineering.

The DASD(SE) periodically reviews the organizations and capabilities of the military departments with respect to systems engineering, development planning, and lifecycle management and sustainability, and identifies needed changes or improvements to such organizations and capabilities. The DASD(SE) prepares and submits a bi-annual report to Congress on systems engineering activities and effectiveness.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*

This PE includes efforts by the office of the DASD(SE) in implementing the Department's Trusted Defense System Strategy. Specifically, the PE will develop and mature the critical sub discipline of systems engineering - system security engineering (SSE), Hardware and Software Assurance, and the Comprehensive Program Protection Planning process that implements a risk-based approach to protection of critical program information, critical components and mission functions, and information in acquisition programs. These efforts include study and maturation of policy, guidance, system security discipline fundamentals, such as engineering methods, tools, and best practices, and establishing a coalition of assurance activities across the DoD to provide analytical and technical support to acquisition programs. These activities will be promulgated in defense acquisition as a fundamental element of DASD(SE) systems engineering and technical reviews.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	44.683	37.655	37.569	-	37.569
Current President's Budget	43.248	39.581	32.429	-	32.429
Total Adjustments	-1.435	1.926	-5.140	-	-5.140
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	2.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.418	-			
• Realignment for Higher Priority Programs	-	-	-4.210	-	-4.210
• FY15 Reprog. for Cancelled Account	-0.017	-	-	-	-
• FFRDC Reduction	-	-0.074	-	-	-
• Efficiency Reductions	-	-	-0.657	-	-0.657
• Economic Assumptions	-	-	-0.273	-	-0.273

Change Summary Explanation

The FY 2017 funding request includes reduction of $2.213 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / *Systems Engineering*	Project (Number/Name) P142 / *Systems Engineering*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P142: *Systems Engineering*	98.151	33.516	35.025	28.789	-	28.789	33.915	33.469	33.093	33.742	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project P142 supports the execution of the missions of the Deputy Assistant Secretary of Defense for Systems Engineering (DASD(SE)) to: (1) provide flexible engineering policy, guidance, and workforce development requirements for the DoD acquisition workforce; (2) foster an acquisition environment of collaboration, teamwork, and joint ownership of program success through a proactive program oversight process, ensuring appropriate levels of systems engineering discipline are applied through all phases of the acquisition life cycle; and (3) engage all stakeholders across government, industry, and academia to collectively advance systems engineering practice and achieve acquisition excellence. The outcome of this effort is to ensure systems engineering principles and disciplines are fully accepted and assimilated into the DoD acquisition workforce positioning the DoD for acquisition excellence and leading to a stronger national defense.

Activities include the following functions:

• Work with acquisition program managers to prepare systems engineering plans (SEPs) to document the technical management approach.
• Conduct periodic program engagements in support of technical reviews to confirm programs are executed in accordance with the SEP.
• Review all aspects of the systems engineering process for major defense acquisition programs (MDAPs) to ensure they are adequate to support fielding and the achievement of cost and performance goals including producibility, reliability, sustainment, and other considerations.
• Participate in Systems Engineering Integrated Project Teams (IPTs), Systems Engineering Working Integrated Project Teams (WIPTs), and Systems Engineering technical reviews, especially Preliminary Design Reviews and Critical Design Reviews.
• Work with DoD Service program managers, their staffs, and other organizations, technical authorities, and oversight organizations to develop and implement technical management programs for MDAPs.
• Conceive plans and lead program support reviews and assessments of MDAP weapons systems and other programs (e.g., Major Automated Information Systems (MAIS)) to shape technical planning and management to ensure program success.
• Conduct other technical reviews as requested (e.g., Nunn-McCurdy certification reviews, Non-Advocate Reviews, focused technical assessments, and software readiness reviews to identify and mitigate program risk).
• Establish engineering policy, guidance, and workforce development to drive the development of fully capable and supportable weapons systems.
• Oversee Component implementation of engineering initiatives and conduct independent assessments.
• Incorporate new MPTs into the engineering practice for development of weapon systems.
• Advance the principles of modularity and open systems and incorporate them when practicable in the design, and acquisition of weapon systems.
• Develop education and training materials for instructing, maintaining, and enhancing the defense acquisition workforce. Activities include: (1) developing guidance to enhance Engineering (ENG) and Production Quality and Manufacturing (PQM) acquisition career planning and progression; and (2) monitoring, and facilitating Defense Acquisition University (DAU) updates to the systems engineering, quality and specialty engineering courses, to ensure the curriculum represents the education and training requirements necessary to be a viable team member in the acquisition process.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

• Improving the DoD's capabilities in Specialty Engineering (e.g. reliability & maintainability, human-systems integration, weapons safety, value engineering and manufacturing) through policy, program oversight, fostering practice and technology improvements, initiating long-term strategic improvements, and collaborating with industry.
• Advance DoD engineering practices through the use of digital engineering and model-based systems engineering.
• Increase trust in computer hardware and software in warfighting systems by establishing a cadre of activities across the DoD capable of detecting and reducing or eliminating software and hardware vulnerabilities for systems in development and sustainment.
• Serve as the Defense Standardization Executive and oversee the Defense Standardization Program.
• Guide Service and other component organizations in the development planning process to ensure proposed MDAP programs are executable within acceptable levels of risk.
• Resolve long-term major systems engineering challenges such as systems of systems (SoS) systems engineering, systems engineering of complex systems, and pre-program formulation systems engineering trade off analysis.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Systems Engineering Initiatives	33.516	35.025	28.789
Description: The DASD(SE) provides objective assessments of program risk to support knowledge-based decision making by DoD leaders regarding DoD MDAPs and MAISs.			
FY 2015 Accomplishments: Strategic Thrust: Program Support • Conducted deep-dive systems engineering reviews of MDAPs and special interest programs. • Conducted SE and execution risk assessments. • Performed systems integration and development planning risk assessments. • Monitored programs and provided SE oversight to include all MDAPs, MAIS, and special interest programs. • Conducted systemic analysis and process management. • Conducted root cause analysis conducted during and after Program Support Assessments (PSAs). • Conducted detailed performance measurements and analysis. • Provided decision-quality information and recommendations to Defense Acquisition Boards (DABs), In Progress Reviews, Defense Space Acquisition Boards. • Reviewed MDAP Request for Proposals for critical engineering requirements. Strategic Thrust: Specialty Engineering • Developed engineering guidance and policies for the integration of specialty engineering functions as part of the SE responsibility in the acquisition process including, but not limited to, program protection/system security engineering; software; manufacturing, reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Conducted studies and analyses of methods, processes and tools to identify challenges and opportunities, and developed and promulgated best practices and guidance for applying SE to rapid development and acquisition. • Assessed challenges and impact and developed new guidance, best practices, methods, processes, and tools to more effectively implement SE for Systems of Systems. Strategic Thrust: Work Force Development • Carried out duties as Functional Lead for ENG, PQM, all Department non-construction engineering and assist software engineering. • Continued to build an enduring high performance engineering culture across the Department in Systems Engineering. • Updated and deployed courses with increased technical rigor and complex, case-based exercises. • Assessed engineering workforce capability and capacity, and, worked with Components to develop strategies to address identified gaps. • Performed outreach to focus the Department's attention and behavior on promoting an engineering culture. Strategic Thrust: Engineering Policy and Guidance • Developed and updated core SE policy, guidance and standards; reviewed all acquisition policy for SE implications. • Provided advice and made recommendations to the Secretary of Defense and the USD(AT&L) regarding systems engineering and development planning and the execution of these activities within and across Defense acquisition programs. Issued guidance to and consulted with the Heads of the DoD Components with respect to systems engineering and development planning in the DoD. • Provided guidance to Defense acquisition programs for developing and documenting each program's technical strategy and management approach in the SEP throughout the program's lifecycle. Strategic Thrust: Systems Engineering Capabilities Assessment • Worked jointly with Development, Test and Evaluation (DT&E) to develop and track new measurable performance criteria. • Periodically reviewed the organizations and capabilities of the Military Departments and Defense Agencies with respect to systems engineering, development planning, and lifecycle management and sustainability, and identified needed changes or improvements to such organizations and capabilities. • Stored and analyzed performance criteria in SEPs for MDAPs; developed program metrics to aid SE assessments and program execution. Strategic Thrust: Early Systems Engineering and Development Planning • Performed early acquisition risk assessment including pre-MS A engagement with Joint Requirements Oversight Council processes. • Supported Services and COCOMs in pre-MS A formulation.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Supported requirements analyses and analysis of alternatives. • Supported initial capabilities document development. Strategic Thrust: Engineering Tools and Environments • Identified relevant engineering organizations who are currently engaging in, or would significantly benefit from digital engineering. • Established cross-service collaboration team to promote the use of digital engineering and model-based systems engineering across the DoD. • Led modularity and open systems architecture systems standards efforts to identify activities, successes, gaps, and best practices in open modular architectures and open standards for the FY 2015 NDAA and Better Buying Power, through the Defense Standardization Council.			
FY 2016 Plans: Strategic Thrust: Program Support Continue to: • Monitor programs, providing SE oversight and support to all MDAPs, Major Automated Information Systems (MAIS), and special interest programs. • Expand root cause analysis conducted during and after Program Support Assessments (PSAs). • Expand use of detailed performance measurement and analysis. • Provide decision-quality information and recommendations to DABs, In Progress Reviews, Peer Reviews, and PDR/CDR assessments. Strategic Thrust: Workforce Development • Carry out Functional Lead duties for Engineering (ENG), Production, Quality, and Manufacturing(PQM), conduct Key Leader Position board for PQM • Update and deploy courses with increased technical rigor and complex, case-based exercises. • Investigate workforce development initiatives including leadership development, specialized training, and improved instructional methods. • Assess engineering workforce capability and capacity, and, working with Components, develop strategies to address identified gaps. • Perform outreach to services and OSD to focus the Department's attention and behavior on promoting an engineering culture. Strategic Thrust: Engineering Policy and Guidance • Develop and update core SE policy, guidance and standards; review all acquisition policy for SE implications.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Develop engineering guidance and policies for the integration of specialty engineering functions including, but not limited to, program protection/system security engineering; software; manufacturing, reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management. • Provide guidance to Defense acquisition programs for developing and documenting each program's technical strategy and management approach in the SEP throughout the program's lifecycle. Strategic Thrust: Systems Engineering Capabilities Assessment • Work jointly with DT&E to develop and track measurable performance criteria. • Develop and strengthen component SE organization and capabilities. • Periodically review the organizations and capabilities of the Military Departments and Defense Agencies with respect to systems engineering, development planning, and lifecycle management and sustainability, and identify needed changes or improvements to such organizations and capabilities. • Issue guidance to and consult with the Heads of the DoD Components with respect to systems engineering and development planning in the DoD. • Store and analyze performance criteria in SEPs and Test and Evaluation Master Plans (TEMPs) for MDAPs; develop program metrics to aid SE assessments and program execution. Strategic Thrust: Early Systems Engineering and Development Planning • Perform early acquisition risk assessment including pre-MS A engagement with Joint Requirements Oversight Council processes. • Provide the following support: (1) Services and COCOMs in pre-MS A formulation; (2) requirements analyses and analysis of alternatives; and (3) initial capabilities document definition and development. Strategic Thrust: Engineering Tools and Environments • Establish guidance and education to support digital engineering use in Systems Engineering. • Continue collaboration in digital engineering methods, processes, tools development and gap identification. • Oversee development of, and incorporation of modularity and open system technical enablers by Services in their acquisition efforts.			
FY 2017 Plans: Strategic Thrust: Program Support Continue to: • Monitor programs, providing SE oversight and support to all MDAPs, Major Automated Information Systems (MAIS), and special interest programs. • Expand root cause analysis conducted during and after Program Support Assessments (PSAs).			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Expand use of detailed performance measurement and analysis. • Provide decision-quality information and recommendations to DABs, In Progress Reviews, Peer Reviews, and PDR/CDR assessments. Strategic Thrust: Work Force Development • Carry out duties as Functional Lead for Engineering (ENG), Production, Quality, and Manufacturing(PQM), all Department non-construction engineering and assist software engineering. • Build an enduring high performance engineering culture across the Department in Systems Engineering. • Update and deploy courses with increased technical rigor and complex, case-based exercises. • Investigate workforce development initiatives including leadership development, specialized training, and improved instructional methods. • Assess engineering workforce capability and capacity, and, working with Components, develop strategies to address identified gaps. • Perform outreach to services and OSD to focus the Department's attention and behavior on promoting an engineering culture. Strategic Thrust: Engineering Policy and Guidance • Develop and update core SE policy, guidance and standards; review all acquisition policy for SE implications. • Develop engineering guidance and policies for the integration of specialty engineering functions as part of the SE responsibility in the acquisition process including, but not limited to, program protection/system security engineering; software; manufacturing, reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management. • Assess challenges and impact; develop new guidance, best practices, methods, processes and tools to more effectively implement SE for Systems of Systems. • Provide guidance to Defense acquisition programs for developing and documenting each program's technical strategy and management approach in the SEP throughout the program's lifecycle. Strategic Thrust: Systems Engineering Capabilities Assessment • Work jointly with DT&E to develop and track measurable performance criteria. • Develop and strengthen component SE organization and capabilities. • Periodically review the organizations and capabilities of the Military Departments and Defense Agencies with respect to systems engineering, development planning, and lifecycle management and sustainability, and identify needed changes or improvements to such organizations and capabilities. • Issue guidance to and consult with the Heads of the DoD Components with respect to systems engineering and development planning in the DoD.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Store and analyze performance criteria in SEPs and Test and Evaluation Master Plans (TEMPs) for MDAPs; develop program metrics to aid SE assessments and program execution. Strategic Thrust: Early Systems Engineering and Development Planning • Perform early acquisition risk assessment including pre-MS A engagement with Joint Requirements Oversight Council processes. • Support: (1) Services and COCOMs in pre-MS A formulation; (2) requirements analyses and analysis of alternatives; and (3) initial capabilities document definition and development. Strategic Thrust: Engineering Tools and Environments • Establish guidance and education to support digital engineering use in Systems Engineering. • Continue collaboration in digital engineering methods, processes, tools development and gap identification. • Oversee development of, and incorporation of modularity and open system technical enablers by Services in their acquisition efforts.			
Accomplishments/Planned Programs Subtotals	33.516	35.025	28.789

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Improved the Systems Engineering effectiveness of the Department's acquisition enterprise and provided Department leadership with technical insights into acquisition program performance through:

• Systems engineering plans (SEPs) reviewed and approved to document each program's technical management approach.
• Program support assessments (PSAs) and periodic program engagements conducted and program technical reviews supported to confirm programs are executed in accordance with the SEP.
• Technical reviews conducted as requested (e.g., Nunn-McCurdy certification reviews, Non-Advocate Reviews, and focused technical assessments to identify and mitigate program risk).
• DABs, Overarching Integrated Product Teams (OIPTs), and other program review participation to provide technical insights to OSD stakeholders.
• Effective systems engineering policy and guidance established and promulgated throughout the Military Services and the Defense Acquisition System.
• A systems engineering workforce staffed, trained and certified with capable and experienced personnel.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P142 / *Systems Engineering*

• Improved reliability engineering, reliability growth management, and reliability monitoring in program development contracting, execution and sustainment.
• Service and other component organizations engaged and supported in the development planning process through effective policy, guidance, document reviews and program engagement to ensure proposed MDAP programs are executable within acceptable levels of risk.
• Increased use of digital artifacts in acquisition decision making and expansion of design options.
• Increased use of modular designs and design techniques in weapon systems, coupled with appropriate contracting language and follow through.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / *Systems Engineering*	Project (Number/Name) P143 / *Program Protection*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P143: *Program Protection*	13.048	4.397	4.556	3.640	-	3.640	4.485	4.483	4.552	4.642	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) must address cybersecurity and supply chain risks to DoD networks, weapons systems, and information stored and processed on both DoD and Defense Industrial Base (DIB) unclassified networks that support DoD programs. Increased reliance on the internet as a vehicle for sharing information, globalization of the supply chain, and advanced persistent threats (APTs) that can evade commercially available security tools and defeat generic security best practices, drives the need for diligent program protection planning and execution. Program Protection Planning includes protection of critical program information, critical components and mission functions, and integrates high level security policies and practical expertise to specific acquisition practices, systems engineering activities, and risk reduction activities. Through this initiative the Department is maturing system security engineering methodologies to protect controlled unclassified information, to include controlled technical information on contractor networks; improve mitigation of supply chain risk management risks, improve integration of cybersecurity into the engineering processes, improve software assurance practices, mature processes to identify Critical Program Information and improve program protection planning. Activities carried out, support implementation of DoD Instruction 5200.44 Trusted Systems and Networks with the use of proven mitigation techniques and tools, the ongoing refinement of risk management processes, and creation of needed technology; implementation of DoD Instruction 5200.39 Critical Program Information (CPI) Identification and Protection Within Research, Development, Test, and Evaluation (RDT&E) to identify and protect Critical Program Information; and implementation of Safeguarding Controlled Unclassified Information on contractor owned networks.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Program Protection	4.397	4.556	3.640

Description: DASD SE provides system security engineering policy, guidance and objective assessments to reduce risks in sharing and storing Controlled Technical Information, improve mitigation of supply chain risk management risks, improve integration of cybersecurity into the engineering processes, improve software and hardware assurance practices and anti-tamper practices, mature processes to identify Critical Program Information and improve program protection planning. Activities carried out support implementation of DoD Instruction 5200.44 Trusted Systems and Networks with the use of proven mitigation techniques and tools, the ongoing refinement of risk management processes, and creation of needed technology; implementation of DoD Instruction 5200.39 Critical Program Information (CPI) Identification and Protection Within Research, Development, Test, and Evaluation (RDT&E) to identify and protect Critical Program Information; and implementation of Safeguarding Controlled Unclassified Information on contractor owned networks.

FY 2015 Accomplishments:

• Provided support to Acquisition Category (ACAT) I programs to conduct broad program protection planning.
- Conducted criticality analyses to determine system vulnerabilities.
- Provided support to develop Program Protection Plans, and track progress to verify protection of critical program capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P143 / *Program Protection*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Reviewed ACAT I Program Protection Plans and provide recommendations for their approval to USD(AT&L). • Advanced the state of the practice of systems security engineering. - Continued to develop methodology to identify and mitigate security risk. - Led the development of DAU Courseware, matured guidance, mentored of Service teams, provided trainingand continued outreach activities with government and industry. - Developed updates to acquisition policy to address cyber security. - Supported implementation and tracking of industry activities to protect technical information. • Hardware and Software Assurance (HwA and SwA) - Managed DoD's efforts to establish and operate the Joint Federated Assurance Center (JFAC), including setting objectives for maturation and effectiveness of the enterprise, support the JFAC Steering Committee, establishing and monitoring annual and FYDP JFAC budgets. - Managed DoD's efforts in Anti-Tamper and Trusted Microelectronics. - Provided subject matter experts in hardware and software assurance to AT&L-led program reviews and acquisition oversight activities.			
FY 2016 Plans: Continue to: • Provide support to Acquisition Category (ACAT) I programs to conduct broad program protection planning. - Conduct criticality analyses to determine system vulnerabilities. - Develop Program Protection Plans, and track progress to verify protection of critical program capabilities. - Review ACAT I Program Protection Plans and provide recommendations for their approval to USD(AT&L). • Advance the state of the practice of systems security engineering. - Continue development of methodology to identify and mitigate system security, to include cybersecurity risk. - Continue to develop courseware, refine guidance, mentor Service teams, provide training, and outreach with government and industry. - Finalize policy for cybersecurity. - Track implementation of industry network security and protection of technical information. • Hardware and Software Assurance (HwA and SwA) - Support the activities of the JFAC steering council, run the AO Working Group. - Facilitate JFAC achieving IOC and conducting a capability gap analysis.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P143 / *Program Protection*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Provide SME support to acquisition program reviews and oversight. ***FY 2017 Plans:*** Continue to: • Provide support to Acquisition Category (ACAT) I programs to conduct broad program protection planning. - Conduct criticality analyses to determine system vulnerabilities. - Develop Program Protection Plans, and track progress to verify protection of critical program capabilities. - Review ACAT I Program Protection Plans and provide recommendations for their approval to USD(AT&L). • Advance the state of the practice of systems security engineering. - Continue development of methodology to identify and mitigate system security, to include cybersecurity risk. - Continue to develop courseware, refine guidance, mentor Service teams, provide training, and outreach with government and industry. • Hardware and Software Assurance (HwA and SwA) - Conduct hardware and software technical working groups, assurance oversight steering council and support group. - Approve HwA and SwA concept of operations for collaboration activities and program support. - Approve strategic plan: establish requirements and schedule for Initial Operating Capabilities (IOC) of HwA and SwA efforts. - Conduct comprehensive survey across HwA and SwA activities to: document capability and capacity, identify gaps, propose gap mediation investments.			
Accomplishments/Planned Programs Subtotals	4.397	4.556	3.640

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The program protection project supports activities focused on: (1) improving system security engineering to reduce risks in sharing and storing controlled unclassified information, to include controlled technical information, (2) improve mitigation to supply chain risks, (3) Program Protection Plans reviewed and recommended for USD(AT&L) approval, (4) effective system security engineering policy and guidance, (5) improve software and hardware assurance and anti-tamper practices and implementation, (6) mature processes to identify and protect critical program information, critical components and mission functions.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P143 / *Program Protection*

Impact of the program protection initiative is assessed based upon number of major acquisition programs supported with formal assessments, program protection plans reviewed and approved, and through engagement supporting acquisition policy initiatives related to program protection.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / *Systems Engineering*	Project (Number/Name) P241 / *Systems Engineering Research Center*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P241: *Systems Engineering Research Center*	5.006	5.335	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Systems Engineering Research Center (SERC) is a University Affiliated Research Center (UARC) established in 2008. As a UARC, the SERC is a strategic resource to further systems research and increase its impact on the Department's ability to meet its mission. Greatly improved systems engineering is essential to the Department's strategy to field systems that are agile, affordably sustainable, flexible, and ready for a full range of contingencies in the face of declining budgets and a shrinking workforce. The SERC consists of a network of eighteen research universities from across the US that work collaboratively to bring the best talent in the nation to bear on DoD's systems engineering research problems.

This project code will transfer to the Engineering Science and Technology PE 0603832D8Z in FY 2016.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Systems Engineering Research Center	5.335	-	-
Description: The SERC is a DoD UARC which conducts University-based research that directly supports DoD's Strategic Plan through development of new systems engineering methods, processes and tools. ***FY 2015 Accomplishments:*** Enhanced engineering methods, processes and tools (MPTs) for improvement in the following areas: (1) Systems Engineering Transformation: transform current systems engineering methods to enable rapid, concurrent and scalable definition and affordable development of flexible systems that are responsive to changing threats and missions; (2) Enterprises and Systems of Systems: create foundational methods to develop and design enterprises and system of systems to provide an overwhelming competitive advantage over our adversaries; (3) Trusted Systems: secure defense systems from cyber and other threats through systemic security approaches that complement incomplete current perimeter/network defense methods; and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605142D8Z / *Systems Engineering*	**Project (Number/Name)** P241 / *Systems Engineering Research Center*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
(4) Human Capital Development: speed the professional development of highly capable systems engineers and technical leaders in the Department and the Defense Industrial Base.			
Accomplishments/Planned Programs Subtotals	5.335	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Develop and extend fundamental knowledge, advanced methods, processes and tools and cutting edge techniques for systems engineering of complex designs of relevance to the DoD mission.

- Generation and execution of relevant and appropriate SERC Research tasks.
- Promulgation of advanced SE approaches through research publications, presentations and monographs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605151D8Z / *Studies and Analysis Support - OSD*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	11.707	2.645	2.710	3.797	-	3.797	5.622	5.378	4.959	5.016	Continuing	Continuing
001: *Joint Service Training & Readiness System Development Program*	11.707	2.645	2.710	3.797	-	3.797	5.622	5.378	4.959	5.016	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Service programs were established by the Secretary of Defense to improve the readiness and training of the Active and Reserve Components. This project expedites the development of technologies and systems which improve overall effectiveness and performance of the Total Force. It facilitates the sharing of information, while allowing for the transfer of emerging and innovative technologies among the Services and private sector. In addition, this project supports OSD (P&R), other OSD offices, Joint Staff, Unified Commands, and the Services in promoting more efficient and effective use of resources, increasing the effectiveness of military training, and enhancing the readiness and performance of the Total Force. Projects analyze the contributions to readiness of various programs and training techniques and use the results to expedite new concepts and procedures that increase unit effectiveness or decrease costs. Emphasis is placed on developing analytical tools and systematic methodologies to improve readiness and training resource allocations.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	2.660	3.015	3.339	-	3.339
Current President's Budget	2.645	2.710	3.797	-	3.797
Total Adjustments	-0.015	-0.305	0.458	-	0.458
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-0.300			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-0.005			
• SBIR/STTR Transfer	-0.014	-			
• Realignment of funds	-	-	0.482	-	0.482
• Economic Assumptions	-	-	-0.024	-	-0.024

Change Summary Explanation

Funding adjustment reflects higher priorities and economic assumptions.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605151D8Z / *Studies and Analysis Support - OSD*	Project (Number/Name) 001 / *Joint Service Training & Readiness System Development Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
001: *Joint Service Training & Readiness System Development Program*	11.707	2.645	2.710	3.797	-	3.797	5.622	5.378	4.959	5.016	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Service programs were established by the Secretary of Defense to improve the readiness and training of the Active and Reserve Components. This project expedites the development of technologies and systems which improve overall effectiveness and performance of the Total Force. It facilitates the sharing of information, while allowing for the transfer of emerging and innovative technologies among the Services and private sector. In addition, this project supports OSD Personnel and Readiness (P&R), other OSD offices, Joint Staff, Unified Commands, and the Services in promoting more efficient and effective use of resources, increasing the effectiveness of military training, and enhancing the readiness and performance of the Total Force. Projects analyze the contributions to readiness of various programs and training techniques and use the results to expedite new concepts and procedures that increase unit effectiveness or decrease costs. Emphasis is placed on developing analytical tools and systematic methodologies to improve readiness and training resource allocations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Service Training & Readiness System Development	2.645	2.710	3.797

Description: The Joint Service programs were established by the Secretary of Defense to improve the readiness and training of the Active and Reserve Components. This project expedites the development of technologies and systems which improve overall effectiveness and performance of the Total Force. It facilitates the sharing of information, while allowing for the transfer of emerging and innovative technologies among the Services and private sector. In addition, this project supports OSD (P&R), other OSD offices, Joint Staff, Unified Commands, and the Services in promoting more efficient and effective use of resources, increasing the effectiveness of military training, and enhancing the readiness and performance of the Total Force. Projects analyze the contributions to readiness of various programs and training techniques and use the results to expedite new concepts and procedures that increase unit effectiveness or decrease costs. Emphasis is placed on developing analytical tools and systematic methodologies to improve readiness and training resource allocations.

FY 2015 Accomplishments:

• Initiated assessment of the feasibility of architectural integration between the Army Safety Information Management System (ASMIS) and Force Risk Reduction (FR2);

• Examined the effects of combining Active and Reserve Component (AC/RC) staffs, echelon III and above, into a single mixed AC/RC staff;

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605151D8Z / *Studies and Analysis Support - OSD*	**Project (Number/Name)** 001 / *Joint Service Training & Readiness System Development Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Updated the Reserve Component Simulation Model (R-SIM) to forecast the effects of changes in activation rates and policies and changes in compensation on accession and continuation in the Reserve components; • Studied the feasibility and advisability of permitting individuals with auditory impairment to access as officers in the Armed Forces; • Developed a pilot training program that leverages current mental fitness training programs to build resilient, elite warriors while enhancing skills for recovery; • Developed methodologies for text mining comments in readiness reporting systems to enhance understanding of reported status; • Explored the feasibility of applying the working capital fund strategy to the civilian cyber workforce; • Developed a proof of concept that would provide military personnel seeking education or employment in post-military career positions with “credit” for their non-traditional education and training experiences through the use of “badges;” • Analyzed potential impacts of alternative proposals for changes in Defense Officer Personnel Management Act (DOPMA) with a special focus on joint officer management; and • Using the current source code and applications associated with the Department’s Virtual World Framework (VWF), developed a prototype governance model to support an open source software project to support individual education and collective team training.			
FY 2016 Plans: • Continue to assess feasibility of architectural integration between the ASMIS and FR2; • Test and evaluate pilot training program that leverages current mental fitness training programs to build resilient, elite warriors while enhancing skills for recovery; • Develop implementation strategy for applying the working capital fund strategy to the civilian cyber workforce; • Continue to develop and test improvements/modifications to Department’s Virtual World Framework (VWF); • Evaluate readiness impacts of modifications to the Department’s Total Force personnel systems; and • Respond to Congressional mandates and directives			
FY 2017 Plans: • Continue to assess workforce skills and analyze training requirement to support the DoD Strategy in evolving areas; • Continue to investigate opportunities for a continuum of service in a downsizing military to include the effectiveness and impacts of alternative approach options for reducing force structure; • Continue to identify and analyze opportunities for early and effective incorporation of human systems interface considerations in system training for new acquisitions; • Continue to investigate modeling and simulation technologies to increase training effectiveness and lower costs; and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605151D8Z / *Studies and Analysis Support - OSD*	**Project (Number/Name)** 001 / *Joint Service Training & Readiness System Development Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Respond to Congressional mandates and directives.			
Accomplishments/Planned Programs Subtotals	2.645	2.710	3.797

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Each project contained within this program contains specific metrics to determine progress towards completion. Metrics for all include completed and documented analysis provided by the performer. The completion date for that analysis varies with each project. In addition, to that analysis, each effort contains a roadmap addressing the best use of the findings throughout the department. If the results of the analysis show benefit to the Department, those findings are included in policy, doctrine, tactics and procedures.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	13.002	4.213	5.277	5.302	-	5.302	5.272	5.130	5.216	5.318	Continuing	Continuing
P161: *Nuclear Matters*	13.002	4.213	5.277	5.302	-	5.302	5.272	5.130	5.216	5.318	Continuing	Continuing

A. Mission Description and Budget Item Justification

The purpose of the Nuclear Matters program is to sustain the U.S. nuclear deterrent posture, counter nuclear threats, and to develop nuclear and conventional physical security equipment. The funds for this program are used to support research, development, test and evaluation efforts as well as studies and analyses for nuclear weapons security; use control; nuclear weapons stockpile safety, survivability and performance; countering nuclear threats and office management. Funds are also used to develop and implement plans for stockpile transformation; infrastructure analyses and assessments; DoD-NNSA Nuclear Weapons Council activities, as mandated by Title 10 USC, section 179; radiological and nuclear emergency response efforts; and management of international programs of nuclear cooperation, particularly with respect to enhancing international nuclear safety and security and office management. Nuclear Matters is also responsible for policy development and implementation for personnel reliability; nuclear weapons, nuclear command and control, and special nuclear materials security; use control; nuclear weapons transportation; physical security equipment; countering nuclear threats; and nuclear and radiological incident response.

This Program Element can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	4.359	5.287	5.463	-	5.463
Current President's Budget	4.213	5.277	5.302	-	5.302
Total Adjustments	-0.146	-0.010	-0.161	-	-0.161
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.002	-			
• SBIR/STTR Transfer	-0.144	-			
• FFRDC Adjustment	-	-0.010	-	-	-
• Fiscal Guidance Adjustments	-	-	-0.018	-	-0.018

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense				Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*		R-1 Program Element (Number/Name) PE 0605161D8Z / *Nuclear Matters*			
• Economic Assumptions Adjustment	-	-	-0.042	-	-0.042
• Efficiency SRRB Adjustment	-	-	-0.101	-	-0.101

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / *Nuclear Matters*	Project (Number/Name) P161 / *Nuclear Matters*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P161: *Nuclear Matters*	13.002	4.213	5.277	5.302	-	5.302	5.272	5.130	5.216	5.318	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The purpose of the Nuclear Matters program is to sustain the U.S. nuclear deterrent posture, counter nuclear threats, and to develop nuclear and conventional physical security equipment. The funds for this program are used to support research, development, test and evaluation efforts as well as studies and analyses for nuclear weapons security; use control; nuclear weapons stockpile safety, survivability and performance; countering nuclear threats and office management. Funds are also used to develop and implement plans for stockpile transformation; infrastructure analyses and assessments; DoD-NNSA Nuclear Weapons Council activities, as mandated by Title 10 USC, section 179; radiological and nuclear emergency response efforts; and management of international programs of nuclear cooperation, particularly with respect to enhancing international nuclear safety and security and office management. Nuclear Matters is also responsible for policy development and implementation for personnel reliability; nuclear weapons, nuclear command and control, and special nuclear materials security; use control; nuclear weapons transportation; physical security equipment; countering nuclear threats; and nuclear and radiological incident response.

This Program Element can fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Nuclear Weapons Council (NWC)	0.629	0.693	0.621
Description: The Nuclear Weapons Council (NWC) is a joint Department of Defense (DoD) and Department of Energy (DOE)/ National Nuclear Security Administration (NNSA) organization established by Congress to facilitate cooperation and coordination between the two Departments as they fulfill their dual agency responsibilities for U.S. nuclear weapons stockpile management.			
FY 2015 Accomplishments: - Oversee the activities on the Congressionally mandated Joint DoD-DOE Nuclear Weapons Council and its support committees to include the Nuclear Weapons Council Standing and Safety Committee, the Compartmented Advisory Committee and the Action Officer group			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*	**Project (Number/Name)** P161 / *Nuclear Matters*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Oversee the activities on the Congressionally mandated Joint DoD-DOE Nuclear Weapons Council and its support committees to include the Nuclear Weapons Council Standing and Safety Committee, the Compartmented Advisory Committee and the Action Officer group ***FY 2017 Plans:*** - Oversee the activities on the Congressionally mandated Joint DoD-DOE Nuclear Weapons Council and its support committees to include the Nuclear Weapons Council Standing and Safety Committee, the Compartmented Advisory Committee and the Action Officer group			
Title: International Programs ***Description:*** The United States also participates in several international programs of cooperation regarding nuclear weapons with foreign governments and regional defense organizations that involve unclassified and classified information exchanges. In general, these agreements are designed to promote safety and security, advance stockpile stewardship and collaborate in counter-proliferation efforts. ***FY 2015 Accomplishments:*** - Execute confidence building programs of cooperation with international partners. - Sponsor international partners at national-level nuclear weapons accident/incident exercises. ***FY 2016 Plans:*** - Execute confidence building programs of cooperation with international partners. - Sponsor international partners at national-level nuclear weapons accident/incident exercises. ***FY 2017 Plans:*** - Execute confidence building programs of cooperation with international partners. - Sponsor international partners at national-level nuclear weapons accident/incident exercises.	0.296	0.319	0.199
Title: Nuclear Surety ***Description:*** Because of their political and military importance, destructive power, and the potential consequences of an accident or unauthorized act, nuclear weapons and nuclear weapon systems require special consideration and must be protected against risks and threats inherent in their peacetime and wartime environments. Oversight of the DoD nuclear surety program is provided by Deputy Assistant Secretary of Defense for Nuclear Matters (DASD(NM)). ***FY 2015 Accomplishments:*** - Conduct OSD oversight and provide direction for actions taken under DoDD 4540.5, "Transportation of Nuclear Weapons"; DoDD S-5210.81, "United States Nuclear Weapons Command and Control, Safety, and Security"; DoDD S-3150.7, "Controlling	0.650	0.773	0.748

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*	**Project (Number/Name)** P161 / *Nuclear Matters*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
the Use of Nuclear Weapons"; DoDD 5210.42 and 5210.42-R, "The DoD Personnel Reliability Program'; and DoDD 5210.41 and S-5210.41-M, "Physical Security of Nuclear Weapons." - Support activities that support nuclear surety policy and provide OSD oversight of the Nuclear Surety program. ***FY 2016 Plans:*** - Conduct OSD oversight and provide direction for actions taken under DoDD 4540.5, "Transportation of Nuclear Weapons"; DoDD S-5210.81, "United States Nuclear Weapons Command and Control, Safety, and Security"; DoDD S-3150.7, "Controlling the Use of Nuclear Weapons"; DoDD 5210.42 and 5210.42-R, "The DoD Personnel Reliability Program'; and DoDD 5210.41 and S-5210.41-M, "Physical Security of Nuclear Weapons." - Support activities that support nuclear surety policy and provide OSD oversight of the Nuclear Surety program. ***FY 2017 Plans:*** - Conduct OSD oversight and provide direction for actions taken under DoDD 4540.5, "Transportation of Nuclear Weapons"; DoDD S-5210.81, "United States Nuclear Weapons Command and Control, Safety, and Security"; DoDD S-3150.7, "Controlling the Use of Nuclear Weapons"; DoDD 5210.42 and 5210.42-R, "The DoD Personnel Reliability Program'; and DoDD 5210.41 and S-5210.41-M, "Physical Security of Nuclear Weapons." - Support activities that support nuclear surety policy and provide OSD oversight of the Nuclear Surety program.			
Title: Stockpile Transformation ***Description:*** To meets its security needs and those of its allies, the U.S. will need a safe, secure, and reliable nuclear deterrent for the foreseeable future. There's increased risk, absent nuclear testing, in assuring long-term safety and reliability of today's aging stockpile—the legacy warheads left over from the Cold War. Today's nuclear weapons complex is not sufficiently "responsive" to technical problems in the stockpile, or to potential emerging threats. The task is to ensure the U.S. nuclear weapons stockpile and supporting infrastructure, meets long-term national security needs. ***FY 2015 Accomplishments:*** - Conduct life cycle activities in support of the nuclear weapons stockpile under DoDD 3150.1, "Nuclear Weapons Life Cycle" and DoDI 5030.55, "DoD Procedures for Joint DoD-DOE Nuclear Weapons Life Cycle Activities. - Manage DoD RDT&E activities for nuclear warheads to include B61, W76, W78, W80(0,1), B83, W87, W88 Weapons. - Support studies for warhead replacement. ***FY 2016 Plans:*** - Conduct life cycle activities in support of the nuclear weapons stockpile under DoDD 3150.1, "Nuclear Weapons Life Cycle" and DoDI 5030.55, "DoD Procedures for Joint DoD-DOE Nuclear Weapons Life Cycle Activities. - Manage DoD RDT&E activities for nuclear warheads to include B61, W76, W78, W80(0,1), B83, W87, W88 Weapons.	1.083	1.136	1.268

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*	**Project (Number/Name)** P161 / *Nuclear Matters*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Support studies for warhead replacement. ***FY 2017 Plans:*** - Conduct life cycle activities in support of the nuclear weapons stockpile under DoDD 3150.1, "Nuclear Weapons Life Cycle" and DoDI 5030.55, "DoD Procedures for Joint DoD-DOE Nuclear Weapons Life Cycle Activities. - Manage DoD RDT&E activities for nuclear warheads to include B61, W76, W78, W80(0,1), B83, W87, W88 Weapons. - Support studies for warhead replacement.			
Title: Survivability and Weapons of Mass Destruction (WMD) ***Description:*** In the 2010 Quadrennial Defense Review (QDR), the SECDEF directed the Department to rebalance its policy, doctrine, and capabilities to better support six key missions. The fifth on the list of key missions is to prevent proliferation and counter weapons of mass destruction. This project directly supports the nation's defense strategy. ***FY 2015 Accomplishments:*** Continue to: - Oversee the Nuclear Defense Portfolio. - Plan and coordinate the activities of the National Nuclear Forensics Steering Committee and Working Group. - Develop OSD-wide approach to overseeing Global Nuclear Defense missions within DoD. ***FY 2016 Plans:*** Continue to: - Oversee the Nuclear Defense Portfolio. - Plan and coordinate the activities of the National Nuclear Forensics Steering Committee and Working Group. - Develop OSD-wide approach to overseeing Global Nuclear Defense missions within DoD. ***FY 2017 Plans:*** Continue to: - Oversee the Nuclear Defense Portfolio. - Plan and coordinate the activities of the National Nuclear Forensics Steering Committee and Working Group. - Develop OSD-wide approach to overseeing Global Nuclear Defense missions within DoD.	0.839	0.744	0.757
Title: Nuclear Matters Support Program ***Description:*** The Nuclear Matters support program conducts studies / analyses; DoD-NNSA Nuclear Weapons Council activities; and provides funding for analytical support functions. ***FY 2015 Accomplishments:*** - Submit annual reports to the President and the Congress.	0.716	0.723	0.733

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*	**Project (Number/Name)** P161 / *Nuclear Matters*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue to oversee DoD/DOE relationship regarding the survivability and surety of the national nuclear stockpile. - Continue as DoD Sigma 15 Approval Authority (Interface with DOE/NNSA). - Continue to address Freedom of Information Act and Mandatory Declassification Requests. ***FY 2016 Plans:*** - Submit annual reports to the President and the Congress. - Continue to oversee DoD/DOE relationship regarding the survivability and surety of the national nuclear stockpile. - Continue as DoD Sigma 15 Approval Authority (Interface with DOE/NNSA). - Continue to address Freedom of Information Act and Mandatory Declassification Requests. ***FY 2017 Plans:*** - Submit annual reports to the President and the Congress. - Continue to oversee DoD/DOE relationship regarding the survivability and surety of the national nuclear stockpile. - Continue as DoD Sigma 15 Approval Authority (Interface with DOE/NNSA). - Continue to address Freedom of Information Act and Mandatory Declassification Requests.			
Title: Physical Security and PPBE Support ***Description:*** Provides contract support services that support the Physical Security Enterprise Program, the Security Policy Verification Committee and all Planning, Programming, Budgeting and Execution needs for the Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs / Nuclear Matters. ***FY 2016 Plans:*** - Support the Physical Security Enterprise Program - Support the Security Policy Verification Committee - Provide all Planning, Programming, budgeting and Execution support for the Nuclear Matter' portfolio and countering Weapons of Mass Destruction Systems ***FY 2017 Plans:*** - Support the Physical Security Enterprise Program - Support the Security Policy Verification Committee - Provide all Planning, Programming, budgeting and Execution support for the Nuclear Matter' portfolio and countering Weapons of Mass Destruction Systems	-	0.889	0.976
Accomplishments/Planned Programs Subtotals	4.213	5.277	5.302

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605161D8Z / *Nuclear Matters*	**Project (Number/Name)** P161 / *Nuclear Matters*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Success in this area is measured by compliance with various statutes and DoD directives that govern the conduct of the affairs within the Office of DASD(Nuclear Matters). Success is also measured by the currency of information and usability of the website, timeliness and responsiveness of reports due to Congress, performance in various response exercises, and feedback from a number of senior-level government organizations that DASD(Nuclear Matters) supports.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	19.755	27.012	5.279	7.246	-	7.246	8.163	9.515	9.593	9.711	Continuing	Continuing
002: *Defense Architecture Support*	3.121	0.778	0.902	0.891	-	0.891	0.983	1.001	1.011	1.029	Continuing	Continuing
003: *Integrated Planning and Management*	5.299	23.780	1.501	3.527	-	3.527	4.118	5.219	5.242	5.277	Continuing	Continuing
004: *PNT Navigation*	11.335	2.454	2.876	2.828	-	2.828	3.062	3.295	3.340	3.405	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element supports studies and analysis in the areas of networks, information integration, defense-wide command and control (C2), and communications. This program is funded under Budget Activity 6, RDT&E Management Support because it includes studies and analysis in support of RDT&E efforts.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	27.861	5.289	5.401	-	5.401
Current President's Budget	27.012	5.279	7.246	-	7.246
Total Adjustments	-0.849	-0.010	1.845	-	1.845
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.838	-			
• Program Adjustment	-0.011	-	-0.018	-	-0.018
• FFRDC Reduction	-	-0.010	-	-	-
• Efficiency Reduction	-	-	-0.102	-	-0.102
• Department Adjustment	-	-	2.000	-	2.000
• Economic Assumptions	-	-	-0.035	-	-0.035

Change Summary Explanation

FY 2015: SIBR/STTR adjustment -0.838 million, Program adjustment -0.011 million.
FY 2016: FFRDC Reduction -0.010 million.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605170D8Z *I Support to Networks and Information Integration*

FY 2017: Department increase for NC3 Modeling and Simulation Analysis 2.000 million, Efficiency adjustment -0.102 million, Economic assumption -0.035 million, Program adjustment -0.018 million.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / *Support to Networks and Information Integration*	Project (Number/Name) 002 / *Defense Architecture Support*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
002: *Defense Architecture Support*	3.121	0.778	0.902	0.891	-	0.891	0.983	1.001	1.011	1.029	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Defense Architecture Support includes development, analysis, testing and evaluation of DoD IT Enterprise Reference and solution architecture products in support of the DoD's Joint Information Environment and the closely related Mission Partner Environment. This work also includes improvements to processes that support registration and storage of the Department's enterprise architecture (formerly called DARS). The Department maintains a catalog of architecture data holdings and provides users the ability to store, search, retrieve, and use DoD architecture data through capabilities provided by the architecture portal. The portal is a central, federated hub for discovery, accessibility, understandability, and reusability of architectures. With the ability to import different architecture tool data and display disparate architecture data in a uniform, consistent method for ease of use and understanding. The portal provides a federated environment for sharing of architectures, mission threads, and other related capability integrated information between various authoritative repositories to increase effectiveness and efficiency of decision-making in a dynamic environment by our customers. Implementations are accessible on both the NIPRNET (unclassified) and SIPRNET (Collateral Classified). Key features of the Defense Architecture Support program focus on: (1) Research and Development of JIE and MPE architectures, (2) Making JIE and MPE architecture data visible, accessible, trusted, understandable, and interoperable (2) enabling reuse of validated architecture data to build "composite" integrated architectures; (3) enabling architecture analysis; and, (4) integrating architecture data into the DoD mainstream decision-making processes. The Department of the Air Force, Army, and Navy CIO's collaborate in the development of federation web services via the Enterprise Architecture and Engineering Panel under the oversight of the DoD CIOs Enterprise Architecture and Service Board to ensure DoD-wide access to and usability of all components of the composite DoD enterprise architecture model, enterprise services, data and technical standards.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Architecture Support	0.778	0.902	0.891
FY 2015 Accomplishments: Continue IT Enterprise and solution architecture development, analysis, and registration processes.			
FY 2016 Plans: Continue IT Enterprise and solution architecture development, analysis, and registration processes.			
FY 2017 Plans: Continue IT Enterprise and solution architecture development, analysis, and registration processes.			
Accomplishments/Planned Programs Subtotals	0.778	0.902	0.891

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 002 / *Defense Architecture Support*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

DARS Performance Metrics:

- Timely development and issuance of policy, guidance, processes, and technologies to build, populate, govern, operate, and protect the Network.
- Policies developed and issued for GIG design, architecture content management, implementation, and operations.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / *Support to Networks and Information Integration*	Project (Number/Name) 003 / *Integrated Planning and Management*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
003: *Integrated Planning and Management*	5.299	23.780	1.501	3.527	-	3.527	4.118	5.219	5.242	5.277	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Integrated Planning and Management Project encompasses the National Leadership Command Capability (NLCC) Management Office's (NMO) responsibilities for establishing overall DoD policy and oversight with respect to the capability development, interoperability, standards, and architecture for National and Nuclear Command Capabilities for our National Leadership. The NMO serves as the single point of contact within the Department for policy, long-range plans, programs and budget, integrated mission advocacy, and management of decision-maker capabilities. NMO's objective is to ensure capabilities are in place to provide complete and timely situational awareness and decision tools for senior decision-makers. Additionally, the NMO assists the DoD CIO as the Executive Agent and primary OSD advocate for the White House Military Office with oversight of a wide range of DoD command and control and communications (C3) assets and oversees the efforts of the Services and Agencies in the design, integration, and deployment of critical and sensitive C3 capabilities. Three overall areas of focus include: 1) National Senior Leader C3 Systems, National Security/Emergency Preparedness (NS/EP), DoD support to Civil Authorities; Continuity of Government (COG); 2) Nuclear C2, Integrated Missile Defense, Tactical Warning, Global Strike; and 3) Cyber Mission Indications and Warnings.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Integrated Planning and Management	23.780	1.501	3.527
FY 2015 Accomplishments: $22.500 million – classified program – Details can be provided at a higher classification under separate cover. $1.280 million: - Continued to enhance architecture products, conducted testing analysis and systems engineering to enable national security systems and applications were validated to provide assured communications in support of senior leadership. - Leveraged the NSA's Commercial Solutions for Classified (CSfC) approach to develop a standard reference architecture for secure mobile phones. - Continued efforts for fielding robust, modernized and secure, mobile (smart phone and tablet) devices and services for senior leadership, for use world-wide. Plans for each FY are fully identified in the Senior Leader Secure Communications Modernization Implementation Plan (SLSCM IP). - Continued to enhance the scope of quantitative voice quality testing (Phantom Signal Program) and associated analysis and validation activities. Each year multiple test events are planned, executed and associated analysis is conducted. - Continued risk reduction and engineering efforts within a flexible and dynamic test bed environment for senior leader solutions and infrastructure advancement validation. Efforts include a wide range of modern communications leveraging the Commercial Solutions for Classified (CSfC) approach pioneered by NSA: secure mobile phones, secure tablets, travel kits and vehicular			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 003 / *Integrated Planning and Management*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
communications. Efforts are closely worked with the broader stakeholder community and leverages efforts/funding by the broader community National Security and Emergency Preparedness (NS/EP) community (includes support to the EO13618). - Developed Measures to inform subordinate JCIDS documents relationships under the Overarching NLCC ICD. ***FY 2016 Plans:*** Continue to enhance architecture products, conduct testing analysis and systems engineering to enable national security systems and applications are validated to provide assured communications in support of senior leadership. - Continue the efforts for fielding robust, modernized and secure, mobile (smart phone and tablet) devices and services for senior leadership, for use world-wide. Plans for each FY are fully identified in the SLSCM IP. - Continue to enhance the scope of quantitative voice quality testing (Phantom Signal Program) and associated analysis and validation activities. Each year multiple test events are planned, executed and associated analysis is conducted. - Continue risk reduction and engineering efforts within a flexible and dynamic test bed environment for senior leader solutions and infrastructure advancement validation. Efforts include a wide range of modern communications leveraging the Commercial Solutions for Classified (CSfC) approach pioneered by NSA: secure mobile phones, secure tablets, travel kits, vehicular communications, and development of common network access mechanisms. Efforts are closely worked with the broader stakeholder community and leverages efforts/funding by the broader community National Security and Emergency Preparedness (NS/EP) community (includes support to the EO13618). ***FY 2017 Plans:*** $2.000 million - NC3 Modeling and Simulation and Analysis - The NC3 system is a complex architecture that utilizes a "system of systems" approach. The current NC3 model focuses on VLF/LF communications after a high altitude electromagnetic pulse (HEMP) event. This funding will focus on expanding the current NC3 modeling to additional survivable communications systems. The goal is to provide insight on operational impact of changes/degradation of single or multiple systems - supports planning, architecture, and investments. $1.527 million: Continue to enhance architecture products, conduct testing analysis and systems engineering to enable national security systems and applications are validated to provide assured communications in support of senior leadership. - Continue the efforts for fielding robust, modernized and secure, mobile (smart phone and tablet) devices and services for senior leadership, for use world-wide. Begin investigations related to Multi-Level Security (MLS) Multiple Independent Levels of Security (MILS) on a single device. Plans for each FY are fully identified in the SLSCM IP. - Expand the scope of quantitative quality testing (Phantom Signal Program) to include video along with voice associated analysis and validation activities. Expand this program to include Interagency assets within the context of the NS/EP as directed under EO 13618. Each year multiple test events are planned, executed and associated analysis is conducted. - Continue risk reduction and engineering efforts within a flexible and dynamic test bed environment for senior leader solutions and infrastructure advancement validation. Efforts include a wide range of modern communications leveraging the Commercial			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 003 / *Integrated Planning and Management*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Solutions for Classified (CSfC) approach pioneered by NSA: secure mobile phones, secure tablets, travel kits, vehicular communications, and development of common network access mechanisms. Efforts are closely worked with the broader stakeholder community and leverages efforts/funding by the broader community National Security and Emergency Preparedness (NS/EP) community (includes support to the EO13618).			
Accomplishments/Planned Programs Subtotals	23.780	1.501	3.527

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Continue development of the required infrastructure to support Senior Leader Secure Mobile Communications. (measure of systems upgraded/enhanced)
- Continue development of the Overarching NLCC Initial Capabilities Document JROCM taskings. Includes both the development of measures to inform subordinate JCIDS documents as well as a roadmap and investment strategy for the sustainment and modernization of the NLCC.
- Continue policy development (DoDI) for the management of DoD Nuclear Command, Control, and Communications

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / *Support to Networks and Information Integration*	Project (Number/Name) 004 / *PNT Navigation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
004: *PNT Navigation*	11.335	2.454	2.876	2.828	-	2.828	3.062	3.295	3.340	3.405	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding supports Global Positioning System (GPS) User Equipment Synchronization with GPS space and operational control segments to conduct DoD CIO oversight of Global Positioning System (GPS) management and planning activities required for meeting JCIDs requirements. Funding supports policy and guidance for incorporation of alternative means of PNT delivery to augment GPS. Funding also supports the DoD's inputs into interagency activities under the National Space-Based Positioning, Navigation, and Timing Executive Committee.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: PNT Navigation	2.454	2.876	2.828

FY 2015 Accomplishments:

Global Positioning System (GPS) User Equipment Synchronization with GPS space and control segments to conduct DoD CIO oversight of Global Positioning System (GPS) management and planning activities required for meeting JCIDs requirements and supporting the National Space-Based Positioning, Navigation and Timing Executive Committee. Funding supported:

- Managed the International Supplement to GPS Security Policy as all source PNT DoDM.
- Managed the Information Assurance/COMSEC Supplement to GPS Security Policy as all source PNT DoDM.
- Managed the GPS Security Policy as all source DoDM.
- Continued implementation of the GPS Protection Profile matrix from Navigation Warfare Concept of Operations in conjunction with Warfighting Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM.
- Managed PNT Navigation Warfare Instruction and Annexes to all the Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM.
- Managed NextGen interfaces with the GPS Wing, Joint Program Development Office (JPDO), and Air Force. Continued implementation of Red Key Sundown Policy.
- Provided staff support, performed research and conducted studies as directed by DEPSECDEF in his role as co-chair of the National Executive Committee for Space-Based PNT and for DoD CIO in his role as co-chair of the Executive Steering Group.
- Performed annual update of National Five-year Plan for Space-Based Positioning, Navigation and Timing (PNT).
- Drafted FY16 FRP.
- Applied Navigation Warfare Concept of Operations via the Joint Navigation Warfare Center (JNWC) and US STRATCOM to develop Doctrine, Tactics, Techniques and Procedures, Training, Equipment Validation and Material Solutions to Navigation Warfare challenges to the Military Services and Combatant Commanders in the scenarios defined in the CONPLANS and OPLANS.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 004 / *PNT Navigation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Managed and implemented the DoD PNT investment strategy using the NetCentric Operations CPM portfolio to insure PNT material solutions were developed in a synchronized fashion in JCIDs, DAS, and PPBE. - Implemented additional Instructions (DoDIs) for public affairs and receiver certification, and DoDM for security policy. - Managed inventory of DoD GPS receivers. - Analyzed and promoted alternative PNT delivery means for inclusion in the force structure for force protection via PING. - PING included biennial tasking to Intelligence Community (IC) to assess threat vectors to GPS and other means of PNT delivery; biennial operational assessments to reveal gaps in PNT delivery against OPLANS and CONPLANS of COCOMS; maintenance of PNT equipment inventories, refreshed biennially. - Published 2014 Federal Radio navigation Plan (FRP) under SecDef signature. - Published DoDI 4650.08 defining DoD Navigation Warfare (NAVWAR) doctrine. - Published DoDI 4650.09 defining DoD Celestial Reference Frame (CRF) management. - Published the DoD PNT Strategy. - Assumed responsibility for special task directed by DCIO to address acceleration of development and fielding of advanced GPS receivers in the Joint Force. - Conducted inventory of existing GPS receiver equipage. - Prioritized platforms based on warfighter criteria. - Established administrative basis for NDAA directed PNT Council within DoD.			
FY 2016 Plans: Global Positioning System (GPS) User Equipment Synchronization with GPS space and control segments to conduct DoD CIO oversight of Global Positioning System (GPS) management and planning activities required for meeting JCIDs requirements and supporting the National Space-Based Positioning, Navigation and Timing Executive Committee. Funding will support: - Manage the International Supplement to GPS Security Policy as all source PNT DoDM. - Manage the Information Assurance/COMSEC Supplement to GPS Security Policy as all source PNT DoDM. - Manage the GPS Security Policy as all source DoDM. - Continue implementation of the GPS Protection Profile matrix from Navigation Warfare Concept of Operations in conjunction with Warfighting Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM. - Manage PNT Navigation Warfare Instruction and Annexes to all the Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM. - Manage NextGen interfaces with the GPS Wing, Joint Program Development Office (JPDO), and Air Force. Continue implementation of Red Key Sundown Policy. - Provide staff support, perform research and conduct studies as directed by DEPSECDEF in his role as co-chair of the National Executive Committee for Space-Based PNT and for DoD CIO in his role as co-chair of the Executive Steering Group.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 004 / *PNT Navigation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Perform annual update of National Five-year Plan for Space-Based Positioning, Navigation and Timing (PNT). - Complete drafting and coordination of FY16 FRP. - Apply Navigation Warfare Concept of Operations via the Joint Navigation Warfare Center (JNWC) and US STRATCOM to develop Doctrine, Tactics, Techniques and Procedures, Training, Equipment Validation and Material Solutions to Navigation Warfare challenges to the Military Services and Combatant Commanders in the scenarios defined in the CONPLANS and OPLANS. - Manage and implement the DoD PNT investment strategy using the NetCentric Operations CPM portfolio to insure PNT material solutions are developed in a synchronized fashion in JCIDs, DAS, and PPBE. - Implement additional Instructions (DoDIs) for public affairs and receiver certification, and DoDM for security policy. - Manage inventory of DoD GPS receivers. - Analyze and promote alternative PNT delivery means for inclusion in the force structure for force protection via PING. - PING includes biennial tasking to Intelligence Community (IC) to assess threat vectors to GPS and other means of PNT delivery; biennial operational assessments to reveal gaps in PNT delivery against OPLANS and CONPLANS of COCOMS; maintenance of PNT equipment inventories, refreshed biennially. - Develop Directives, Instructions, and Manuals for implementation of the PNT Strategy within the Department. - Continue special task directed by DCIO to address acceleration of development and fielding of advanced GPS receivers in the Joint Force. - Maintain and update inventory of existing GPS receiver equipage; expand to include antennae and antennae electronics; expand to include delivery of PNT via other-than-GPS equipment. - Address prioritized platforms in fielding plans and guidance to Services. - Develop MGUE “Roadmap” illustrating necessary fielding milestones for Joint Force MGUE equipage. - Administer PNT Council within DoD via Charter, supporting DoDDs and DoDIs, agendas and minutes for Council meetings, Council task disposition.			
FY 2017 Plans: Global Positioning System (GPS) User Equipment Synchronization with GPS space and control segments to conduct DoD CIO oversight of Global Positioning System (GPS) management and planning activities required for meeting JCIDs requirements and supporting the National Space-Based Positioning, Navigation and Timing Executive Committee. Funding will support: - Manage the International Supplement to GPS Security Policy as all source PNT DoDM. - Manage the Information Assurance/COMSEC Supplement to GPS Security Policy as all source PNT DoDM. - Manage the GPS Security Policy as all source DoDM. - Continue implementation of the GPS Protection Profile matrix from Navigation Warfare Concept of Operations in conjunction with Warfighting Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 004 / *PNT Navigation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Manage PNT Navigation Warfare Instruction and Annexes to all the Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM. - Manage NextGen interfaces with the GPS Wing, Joint Program Development Office (JPDO), and Air Force. Continue implementation of Red Key Sundown Policy. - Provide staff support, perform research and conduct studies as directed by DEPSECDEF in his role as co-chair of the National Executive Committee for Space-Based PNT and for DoD CIO in his role as co-chair of the Executive Steering Group. - Perform annual update of National Five-year Plan for Space-Based Positioning, Navigation and Timing (PNT). - Apply Navigation Warfare Concept of Operations via the Joint Navigation Warfare Center (JNWC) and US STRATCOM to develop Doctrine, Tactics, Techniques and Procedures, Training, Equipment Validation and Material Solutions to Navigation Warfare challenges to the Military Services and Combatant Commanders in the scenarios defined in the CONPLANS and OPLANS. - Manage and implement the DoD PNT investment strategy using the NetCentric Operations CPM portfolio to insure PNT material solutions are developed in a synchronized fashion in JCIDs, DAS, and PPBE. - Implement additional Instructions (DoDIs) for public affairs and receiver certification, and DoDM for security policy. - Manage inventory of DoD GPS receivers. - Analyze and promote alternative PNT delivery means for inclusion in the force structure for force protection via PING. - PING includes biennial tasking to Intelligence Community (IC) to assess threat vectors to GPS and other means of PNT delivery; biennial operational assessments to reveal gaps in PNT delivery against OPLANS and CONPLANS of COCOMS; maintenance of PNT equipment inventories, refreshed biennially. - Develop Directives, Instructions, and Manuals for implementation of the PNT Strategy within the Department. - Continue special task directed by DCIO to address acceleration of development and fielding of advanced GPS receivers in the Joint Force. - Maintain and update inventory of existing GPS receiver equipage; expand to include antennae and antennae electronics; expand to include delivery of PNT via other-than-GPS equipment. - Address prioritized platforms in fielding plans and guidance to Services. - Develop MGUE “Roadmap” illustrating necessary fielding milestones for Joint Force MGUE equipage. - Administer PNT Council within DoD via Charter, supporting DoDDs and DoDIs, agendas and minutes for Council meetings, Council task disposition.			
Accomplishments/Planned Programs Subtotals	2.454	2.876	2.828

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605170D8Z / *Support to Networks and Information Integration*	**Project (Number/Name)** 004 / *PNT Navigation*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Implement and successfully manage PNT Navigation Warfare Instructions and Manuals subordinate to DoDD 4650.05 and Annexes to applicable Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with the appropriate Unified Combatant Command

- Implement the recommendations of the Analysis of Alternatives for the CIO and DCIO C4IIC Global Positioning System (GPS) portfolio of Position, Navigation, and Timing (PNT) programs and activities
- Provide staff support, perform research and conduct studies as directed by the CIO and DCIO C4IIC relating to the Global Positioning System (GPS) portfolio of Position, Navigation, and Timing (PNT) programs and activities

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605200D8Z / *General Support to OUSD(I)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	3.174	2.846	1.686	1.874	-	1.874	2.214	2.393	2.415	2.466	Continuing	Continuing
001: *Sensitive Activities*	2.447	2.128	1.061	1.122	-	1.122	1.439	1.591	1.605	1.647	Continuing	Continuing
002: *Defense Civilian Intelligence Personnel System*	0.312	0.268	0.275	0.402	-	0.402	0.425	0.452	0.460	0.469	Continuing	Continuing
003: *Intelligence, Surveillance, Reconnaissance Operations*	0.415	0.450	0.350	0.350	-	0.350	0.350	0.350	0.350	0.350	Continuing	Continuing

Note

001: The FY 2017 funding request was reduced by $0.431 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

001: Sensitive Activities focuses on developing technologies and their applications on sensitive activities within the Office of the Under Secretary of Defense for Intelligence (OUSD(I)).

002: Defense Civilian Intelligence Personnel System (DCIPS) provides enhancements and updates to the Performance Appraisal Application in the Defense Civilian Personnel Data System used by Military Service Intelligence Components, the Defense Security Service and the OUSD(I) to evaluate the performance of their DCIPS employees. Funds are also used to provide enhancements and updates to the classified Global Force Management (GFM) Defense Intelligence Organizational Server (DIOS), a priority of the Vice Chairman of the Joint Chiefs of Staff, which tracks both civilian and military positions, associated grades and skill levels and hierarchical organizational relationships.

003: Intelligence, Surveillance, Reconnaissance (ISR) Operations requires expert engineering and technical assessments on a wide range of ISR operational issues. Funds will be used to support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense					Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*		R-1 Program Element (Number/Name) PE 0605200D8Z / *General Support to OUSD(I)*			
B. Program Change Summary ($ in Millions)	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**
Previous President's Budget	2.850	2.120	2.274	-	2.274
Current President's Budget	2.846	1.686	1.874	-	1.874
Total Adjustments	-0.004	-0.434	-0.400	-	-0.400
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.434			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-0.004	-	-0.400	-	-0.400

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / *General Support to OUSD(I)*	Project (Number/Name) 001 / *Sensitive Activities*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
001: *Sensitive Activities*	2.447	2.128	1.061	1.122	-	1.122	1.439	1.591	1.605	1.647	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Sensitive Activities focuses on developing technologies and their applications on sensitive activities within the OUSD(I). It includes evaluation of concepts, technology development and feasibility studies related to intelligence processes, shortfalls and requirements that affect intelligence policy, planning and operational guidance.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Sensitive Activities	2.128	1.061	1.122
FY 2015 Accomplishments: Provided technology development and concept evaluation for applications in support of OUSD(I).			
FY 2016 Plans: Provide technology development and concept evaluation for applications in support of OUSD(I).			
FY 2017 Plans: Will continue to provide technology development and concept evaluation for applications in support of OUSD(I).			
Accomplishments/Planned Programs Subtotals	2.128	1.061	1.122

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / *General Support to OUSD(I)*	Project (Number/Name) 002 / *Defense Civilian Intelligence Personnel System*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
002: *Defense Civilian Intelligence Personnel System*	0.312	0.268	0.275	0.402	-	0.402	0.425	0.452	0.460	0.469	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

DCIPS was authorized by Public Law 104-201, effective 01 October 1996 and codified in 10 USC 1601-1614. It provides the Defense Intelligence Enterprise (DIE) with independent civilian personnel authorities necessary to hire, develop, reward, and retain the diverse, versatile and highly qualified workforce necessary to perform the Defense intelligence mission and brings for the first time, the entire DIE under one personnel framework.

These funds are used to develop modifications and updates to the Performance Appraisal Application in the Defense Civilian Personnel Data System and to the classified GFM DIOS. Performance Appraisal Application is a performance management tool used by the Military Services Intelligence Components, Defense Security Service and OUSD(I). The GFM DIOS tracks both civilian and military positions associated grades and skill levels and hierarchical organizational relationships.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Civilian Intelligence Personnel System	0.268	0.275	0.402
FY 2015 Accomplishments: Designed enhancements to improve the effectiveness of the existing DCIPS performance management software and the GFM DIOS. Developed modifications and improvements to the GFM DIOS as additional requirements were identified by the Joint Staff J-8. Some improvements include, but are not limited to, Phase 3 development of the Common Access Point, improved security and developing a capability to report system health and data quality.			
FY 2016 Plans: Design enhancements to improve the effectiveness of the existing DCIPS performance management software and the GFM DIOS. Develop modifications and improvements to the GFM DIOS as additional requirements are identified by the Joint Staff J-8.			
FY 2017 Plans: Will continue to design enhancements to improve the effectiveness of the existing DCIPS performance management software and the GFM DIOS. Continue to develop modifications and improvements to the GFM DIOS as additional requirements are identified by the Joint Staff J-8.			
Accomplishments/Planned Programs Subtotals	0.268	0.275	0.402

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605200D8Z / *General Support to OUSD(I)*	**Project (Number/Name)** 002 / *Defense Civilian Intelligence Personnel System*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0305192D8Z: *Defense Civilian Intelligence Personnel System*	2.201	1.647	1.815	-	1.815	1.850	1.792	1.800	1.835	Continuing	Continuing

Remarks

Funding will be used to develop policy, oversee implementation, assess and continuously improve the effectiveness of DCIPS human capital programs across the DIE. Funding ensures the effectiveness of strategic human capital and workforce planning, and ongoing workforce management, in accordance with both good business practices and to support the effective and efficient conduct of the Defense and National Intelligence missions.

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance for this effort will be measured by the ability of the GFM DIOS to effectively and efficiently track both civilian and military positions, associated grades and skill levels and hierarchical organizational relationships. Measures will include the ability to integrate upgrades to the system in the following areas: Security Access Enhancements, Common Access Point Website Enhancements, System Health Capabilities, Data Consumption Enhancements and additional reporting capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / *General Support to OUSD(I)*	Project (Number/Name) 003 / *Intelligence, Surveillance, Reconnaissance Operations*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
003: *Intelligence, Surveillance, Reconnaissance Operations*	0.415	0.450	0.350	0.350	-	0.350	0.350	0.350	0.350	0.350	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

ISR Operations initiatives fulfill the requirement for expert engineering and technical assessments on a wide range of ISR operational issues used to support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors. The ISR Operations initiatives developed, expanded, and enhanced a prototype framework to ingest and process asset allocation, requirement, tasking and post-mission artifacts and collected sensor data and analyst intelligence products in order to provide semi-automated assessments for CENTCOM/Joint Intel ISR assessments analysts.

ISR Operations initiatives provide expert engineering and technical assessments on a wide range of ISR issues; establish and maintain interfaces with the senior scientific and technical directorates within OUSD(I), the military services and the Combat Support Agencies; integrate ISR Operations technology roadmaps with related program plans and initiatives; and support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Intelligence, Surveillance, Reconnaissance Operations	0.450	0.350	0.350
Description: ISR Operations requires expert engineering and technical assessments on a wide range of ISR operational issues. Funds will be used to support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors. ***FY 2015 Accomplishments:*** ISR Operations initiatives provided expert engineering and technical assessments on a wide range of ISR operational issues. Established and maintained interfaces with the senior scientific and technical directorates within OUSD(I), the military services and the combat support agencies and integrated ISR Operations technology roadmaps with related program plans and initiatives. ***FY 2016 Plans:*** Provide expert engineering and technical assessments on a wide range of ISR operational issues. Support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors. ***FY 2017 Plans:*** Will continue to provide expert engineering and technical assessments on a wide range of ISR operational issues. Funds will be used to support senior level discussions and decisions on ISR Operations related initiatives, platforms and sensors.			
Accomplishments/Planned Programs Subtotals	0.450	0.350	0.350

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605200D8Z / *General Support to OUSD(I)*	**Project (Number/Name)** 003 / *Intelligence, Surveillance, Reconnaissance Operations*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502D8Z *I Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	110.455	52.627	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
P502: *SBIR*	104.165	52.627	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
P500: *STTR*	6.290	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The goals of the Office of the Secretary of Defense (OSD) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are to stimulate technological innovation, increase private sector commercialization of federal Research and Development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	52.627	0.000	0.000	-	0.000
Total Adjustments	52.627	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	52.627	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: P500: *STTR*		
Congressional Add: *Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)*	0.000	-
Congressional Add Subtotals for Project: P500	0.000	-
Congressional Add Totals for all Projects	0.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502D8Z / *Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)*	Project (Number/Name) P502 / *SBIR*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P502: *SBIR*	104.165	52.627	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The goals of the Office of the Secretary of Defense (OSD) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are to stimulate technological innovation, increase private sector commercialization of federal Research and Development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: SBIR	52.627	-	-
Description: A set-aside program for small business to engage in defense R&D with potential for commercialization.			
FY 2015 Accomplishments: *** PLEASE ENTER TEXT ***			
Accomplishments/Planned Programs Subtotals	52.627	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502D8Z / *Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)*	Project (Number/Name) P500 / *STTR*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P500: *STTR*	6.290	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The goals of the Office of the Secretary of Defense (OSD) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are to stimulate technological innovation, increase private sector commercialization of federal research and development (R&D), increase small business participation in federally funded R&D, and foster participation by minority and disadvantaged firms in technological innovation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016
Congressional Add: Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)	0.000	-
FY 2015 Accomplishments: Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)		
Congressional Adds Subtotals	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605790D8Z *I Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	5.045	1.631	2.166	2.187	-	2.187	2.374	2.566	2.601	2.651	Continuing	Continuing
P518: *SBIR/Challenge Admin*	5.045	1.631	2.166	2.187	-	2.187	2.374	2.566	2.601	2.651	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) provides funding for the administration of the Department of Defense (DoD) Small Business Innovation Research (SBIR) Program and the Small Business Technology Transfer (STTR) Program. The SBIR/STTR Program funds over one billion dollars annually in mission oriented research and development projects via small technology companies. The purpose of the program is to stimulate technological innovation, increase private sector commercialization of Federal R&D, increase small business participation in Federally funded R&D, foster participation by minority and disadvantaged firms in technological innovation, and foster cooperative research & technology transfer between small business and research institutions. The SBIR/STTR Program is codified in 15 USC 638. The SBIR/STTR Programs competitively fund scientific and technical innovation to specifically address the needs of participating DoD components.

(U) DoD components participating in the SBIR and STTR Program include the: Army, Navy, Air Force, Defense Advanced Research Projects Agency (DARPA), Missile Defense Agency (MDA), Defense Threat Reduction Agency (DTRA), U.S. Special Operations Command (SOCOM), Joint Science & Technology Office for Chemical & Biological Defense (CBD), National Geospatial-Intelligence Agency (NGA), the Defense Logistics Agency (DLA), the Defense Microelectronics Activity (DMEA), the Defense Health Program (DHP) and the Office of Secretary of Defense (OSD.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	1.631	2.169	2.254	-	2.254
Current President's Budget	1.631	2.166	2.187	-	2.187
Total Adjustments	0.000	-0.003	-0.067	-	-0.067
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Fiscal Guidance Reduction	-	-0.003	-0.008	-	-0.008
• Economic Assumptions Adjustment	-	-	-0.017	-	-0.017
• Efficiency SRRB Adjustment	-	-	-0.042	-	-0.042

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605790D8Z / *Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)*	**Project (Number/Name)** P518 / *SBIR/Challenge Admin*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P518: *SBIR/Challenge Admin*	5.045	1.631	2.166	2.187	-	2.187	2.374	2.566	2.601	2.651	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) The SBIR/STTR Program is executed in three phases. The purpose of Phase I is to determine, insofar as possible, the scientific technical and commercial merit, and feasibility of ideas submitted under the SBIR/STTR Program. Phase II awards are made to firms that have been awarded a Phase I contract on the basis of the results of their Phase I effort and the scientific, technical, and commercial merit of the Phase II proposal. Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable prototype. Phase III SBIR/STTR efforts derive from, extend or conclude Phase I or Phase II efforts, and are not funded with SBIR/STTR funds. Under Phase III, companies participating in the SBIR/STTR Program are expected to obtain funding from the private sector and/or non-SBIR/STTR government sources to develop the prototype into a viable product or non-R&D service for sale in military and/or private sector markets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: SBIR/Challenge Admin	1.631	2.166	2.187
Description: (U) Program element (PE) 0605790D8Z is the only source of funds for the coordination, administration and execution of the Department's SBIR/STTR Programs. The DoD Office of Small Business Programs is tasked with providing Departmental SBIR/STTR policy guidance, oversight and implementation and therefore requires program element (PE) 0605790D8Z to fund these administrative activities. In addition to funding costs for program administration, coordination and execution, PE 0605790D8Z funds essential elements of the SBIR/STTR Program that are required by law including: (1) Coordinate and execute the administrative portions of the DoD SBIR/STTR Programs including the development of technical topics, preparation of SBIR/STTR R&D solicitations and receipt of proposal responses; (2) Maintain and modify automated processes across the entire SBIR/STTR lifecycle including the development and maintenance of information systems and software required for the measurement, evaluation, and effective management of the Department's SBIR/STTR Programs; (3) Implement an aggressive outreach program including the execution of two National conferences and outreach to small technology companies, potential investors in such companies, SDBs, WOSBs, Institutions of Higher Learning, underrepresented states, and others, to facilitate participation in the SBIR/STTR Programs; (4) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in the DoD SBIR Commercialization Readiness Program (CRP); and (5) Prepare all reports mandated by law and policy.			
FY 2015 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605790D8Z / *Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)*	**Project (Number/Name)** P518 / *SBIR/Challenge Admin*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
(U) Program element (PE) 0605790D8Z is the only source of funds for the coordination, administration and execution of the Department's SBIR/STTR Programs. The DoD Office of Small Business Programs is tasked with providing Departmental SBIR/STTR policy guidance, oversight and implementation and therefore requires program element (PE) 0605790D8Z to fund these administrative activities. In addition to funding costs for program administration, coordination and execution, PE 0605790D8Z funds essential elements of the SBIR/STTR Program that are required by law including: (1) Coordinate and execute the administrative portions of the DoD SBIR/STTR Programs including the development of technical topics, preparation of SBIR/STTR R&D solicitations and receipt of proposal responses; (2) Maintain and modify automated processes across the entire SBIR/STTR lifecycle including the development and maintenance of information systems and software required for the measurement, evaluation, and effective management of the Department's SBIR/STTR Programs; (3) Implement an aggressive outreach program including the execution of two National conferences and outreach to small technology companies, potential investors in such companies, SDBs, WOSBs, Institutions of Higher Learning, underrepresented states, and others, to facilitate participation in the SBIR/STTR Programs; (4) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in the DoD SBIR Commercialization Readiness Program (CRP); and (5) Prepare all reports mandated by law and policy.			
FY 2016 Plans: (U) FY 2016 plan includes program administration, coordination, and execution of the SBIR/STTR Program. Specifically, provide policy guidance and oversight regarding execution of the FY 2016 DoD SBIR/STTR budget between 13 Components to include: (1) Coordinate and execute the administrative portions of the DoD SBIR/STTR Programs including the development of technical topics, preparation of SBIR/STTR R&D solicitations, and receipt of proposal responses; (2) Maintain and modify automated processes across the entire SBIR/STTR lifecycle including the development and maintenance of information systems and software required for the measurement, evaluation, and effective management of the Departments' SBIR/STTR Programs; (3) Improve and implement an outreach program to increase interest and facilitate participation of small technology companies, potential investors in such companies, research organizations, acquisition personnel, prime contractors and others in the SBIR/STTR Programs; (4) Leverage DoD SBIR/STTR Commercialization and Outreach Working Groups to promote best practices for meeting legislative requirements and optimizing standard processes for improving SBIR/STTR technology transition and outreach activities; (5) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in DoD Commercialization Readiness Program (CRP); and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605790D8Z / *Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)*	**Project (Number/Name)** P518 / *SBIR/Challenge Admin*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
(6) Prepare all reports mandated by law and policy. ***FY 2017 Plans:*** (U) FY 2017 plan includes program administration, coordination, and execution of the SBIR/STTR Program. Specifically, provide policy guidance and oversight regarding execution of the FY 2016 DoD SBIR/STTR budget between 13 Components to include: (1) Coordinate and execute the administrative portions of the DoD SBIR/STTR Programs including the development of technical topics, preparation of SBIR/STTR R&D solicitations, and receipt of proposal responses; (2) Maintain and modify automated processes across the entire SBIR/STTR lifecycle including the development and maintenance of information systems and software required for the measurement, evaluation, and effective management of the Departments' SBIR/STTR Programs; (3) Improve and implement an outreach program to increase interest and facilitate participation of small technology companies, potential investors in such companies, research organizations, acquisition personnel, prime contractors and others in the SBIR/STTR Programs; (4) Leverage DoD SBIR/STTR Commercialization and Outreach Working Groups to promote best practices for meeting legislative requirements and optimizing standard processes for improving SBIR/STTR technology transition and outreach activities; (5) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in DoD Commercialization Readiness Program (CRP); and (6) Prepare all reports mandated by law and policy.			
Accomplishments/Planned Programs Subtotals	1.631	2.166	2.187

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

(U) Performance is in support of the administration of the program and compliance with statutory requirements.

(U) For PE 0605790D8Z, management and administration of the DoD SBIR/STTR Programs, the following measures have been established to meet requirements as mandated by law: 1) Coordinate and execute the administrative portions of the DoD SBIR/STTR Programs, especially the creation of the five solicitations; 2) Maintain and improve automated processes across the entire SBIR/STTR lifecycle; 3) Develop and conduct an aggressive outreach program, especially the planning and

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605790D8Z / *Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)*	**Project (Number/Name)** P518 / *SBIR/Challenge Admin*

execution of an annual government training workshop and one small business conference; 4) Coordinate oversight, collect results, track execution and provide reporting of Phase

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	21.357	115.933	22.650	-	22.650	25.867	27.736	27.948	28.497	Continuing	Continuing
P796: *Laboratory Resource Management*	-	11.929	2.034	3.155	-	3.155	3.636	3.856	3.897	3.973	Continuing	Continuing
P797: *Defense Technology Analysis*	-	5.707	105.525	4.705	-	4.705	5.081	5.618	5.677	5.789	Continuing	Continuing
P798: *Defense Support Teams*	-	1.480	1.468	2.116	-	2.116	2.288	2.397	2.422	2.469	Continuing	Continuing
P579: *Critical Technology Assessments*	-	0.584	0.799	1.202	-	1.202	1.322	1.426	1.440	1.468	Continuing	Continuing
P102: *Data Vulnerability Assessment and Analysis*	-	1.657	6.107	11.472	-	11.472	13.540	14.439	14.512	14.798	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) is the principal staff advisor to the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)), and the Secretary and Deputy Secretary of Defense for Research and Engineering (R&E) matters. In this capacity, the ASD(R&E) has the responsibility to conduct analyses and studies; develop policies; provide technical leadership, oversight and advice; make recommendations; and issue guidance for Department of Defense (DoD) R&E programs. Additionally, the ASD(R&E) provides technical support to the USD(AT&L) on R&E aspects of programs subject to review by the Defense Acquisition Board, to include assessments of technology maturity consistent with DoD acquisition policy. The mission of the DoD R&E program is to create, demonstrate, prototype, and apply technology that enables affordable and decisive military superiority. Pursuing the R&E mission requires attention to: (1) identification and development of new technological opportunities; (2) insertion of new technologies into warfighting systems and operations; and (3) management and evaluation of the effectiveness of technology programs. This program element (PE) provides mission support to the Office of the ASD(R&E) (OASD(R&E)) covering a wide range of studies and analysis in support of the R&E program, and its impacts to the Department's decision to fund Research, Development, Test and Evaluation (RDT&E) efforts.

The PE provides funding for the Defense Laboratory Office within the ASD(R&E). The Defense Laboratory Office advocates and invests in the DoD laboratory system in three areas: (1) facilities and infrastructure; (2) quality of workforce; and (3) global insight of critical or strategic technologies important to the Department and the Nation.

The PE provides engineering, scientific, and analytical support to the ASD(R&E) in its responsibility for direction, overall quality, and content of the science and technology (S&T) program. Ensures that the technology being developed is affordable and minimizes system development risk. The Defense Technology Analysis program conducts assessments and analysis, to ensure maximum utilization of research and development funds, to accomplish the overall objectives of the S&T program. Funds are required for technical, analytical and management support, equipment and supplies, travel, and publications.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*

The DoD's key expertise for reviewing and guiding R&E programs resides in the ASD(R&E). The ASD(R&E) staff augment their responsibilities through their connections to technology experts in various fields throughout academia, industry, and government. The Defense Support Teams project supports the directed responsibilities by building teams of technology experts to conduct program technical assessments. The teams analyze the key engineering problem areas and offer adjustments in the development and test plan; alternate technical approaches; or new technologies that could enable successful development. The teams provide unbiased reviews and gather advice from the Nation's leading technical experts.

The PE provides funding for Critical Technology Assessments within ASD(R&E). Critical Technology Assessments provide the technical reference guidance in support of development and implementation of DoD technology security policies on international transfers of defense related goods, services, and technologies. The program provides an ongoing assessment and analysis of global goods and technologies; determines significant advances in the development, production, and use of military capabilities by potential adversaries; and determines goods and technologies being developed worldwide with potential to significantly enhance or degrade U.S. military capabilities in the future.

This PE also provides funding for the Data Vulnerability Tiger Team to establish a joint analysis capability to conduct comprehensive assessments of unclassified information losses, engaging acquisition and intelligence sources to determine consequences and appropriate preventative/mitigation actions.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	22.074	13.960	24.809	-	24.809
Current President's Budget	21.357	115.933	22.650	-	22.650
Total Adjustments	-0.717	101.973	-2.159	-	-2.159
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	102.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.708	-			
• Realignment for Higher Priority Programs	-	-	-1.545	-	-1.545
• FY15 Reprog. for Cancelled Account	-0.009	-	-	-	-
• FFRDC Reduction	-	-0.027	-	-	-
• Efficiency Reductions	-	-	-0.434	-	-0.434
• Economic Assumptions	-	-	-0.180	-	-0.180

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Project: P796: *Laboratory Resource Management*		
Congressional Add: *Defense Technology Transfer Program*	10.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605798D8Z *I Defense Technology Analysis*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2015	FY 2016
Congressional Add Subtotals for Project: P796	10.000	-
Project: P797: *Defense Technology Analysis*		
Congressional Add: *Assessment of Major Weapon System Cyber Vulnerabilities*	-	100.000
Congressional Add Subtotals for Project: P797	-	100.000
Congressional Add Totals for all Projects	10.000	100.000

Change Summary Explanation

FY 2016 Congressional Adds include: $2.000 million Program Increase; $100.000 million Assessment of Major Weapon System Cyber Vulnerabilities. $100.000 million for the cyber vulnerability assessment will be reprogrammed to the Assistant Secretary of Defense for Acquisition (ASD(A)) for execution.

FY 2017 internal realignment reflects funding for higher Departmental priorities and requirements and reduction of $0.226 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / *Defense Technology Analysis*	Project (Number/Name) P796 / *Laboratory Resource Management*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P796: *Laboratory Resource Management*	-	11.929	2.034	3.155	-	3.155	3.636	3.856	3.897	3.973	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Laboratory Office provides advocacy, strategic planning, and policy for the DoD's in-house laboratories. The DoD Laboratory Enterprise consists of 62 laboratories with approximately 67,000 employees, and an annual budget of more than $30.000 billion. The Defense Laboratory Office develops plans and investment strategies for laboratory infrastructure, technology programs, and personnel development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Laboratory Office	1.929	2.034	3.155
Description: Provides advocacy, strategic planning, and policy for the DoD's in-house laboratories. Develops plans and investment strategies for laboratory infrastructure, technology programs, and personnel development. ***FY 2015 Accomplishments:*** • Collected and analyzed DoD lab metrics. Determined significance of trends and developed corrective actions as needed. • Expanded the function of the Technology Transfer (T2) Center of Excellence established in FY 2014. Collected and analyzed metrics. • Conducted first DoD Lab Day to communicate the research efforts, products, and capabilities of the DoD laboratories. ***FY 2016 Plans:*** • Continue refinement of DoD laboratory metrics for assessment of in-house lab system. Formulate recommendations to ASD(R&E) and Service leadership for improvements to identify problem areas within the lab system based upon data collected and concurrent trends analyses. • Decide to terminate, continue or expand the T2 Center of Excellence established in FY 2014. Decision will be guided by metrics such as number of new technology products transferred to dual-use marketplace and offered back to DoD at reduced cost, number of new start-up companies in the dual-use marketplace, and economic impact of expanded DoD lab T2 program. ***FY 2017 Plans:*** Continue strategic planning and policy development for oversight of DoD in-house laboratories.			
Accomplishments/Planned Programs Subtotals	1.929	2.034	3.155

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*	**Project (Number/Name)** P796 / *Laboratory Resource Management*

	FY 2015	FY 2016
Congressional Add: Defense Technology Transfer Program	10.000	-
FY 2015 Accomplishments: Conducted a pilot program on public-private technology transfer ventures between DoD research and development centers and regionally focused technology incubators, with the goal of increasing the commercialization of intellectual property developed in the Department's research and development enterprise, in support of critical cross-service technological needs.		
Congressional Adds Subtotals	10.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The performance of the Laboratory Resource Management project is based on the success of initiatives to implement strategic planning objectives. Measures include the quality and timeliness of policy, plans, guidance, and processes.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / *Defense Technology Analysis*	Project (Number/Name) P797 / *Defense Technology Analysis*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P797: *Defense Technology Analysis*	-	5.707	105.525	4.705	-	4.705	5.081	5.618	5.677	5.789	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Technology Analysis (DTA) project provides engineering, scientific, and analytical support to the Office of the Deputy Assistant Secretary of Defense for Research (ODASD(R)) in its responsibility for direction, overall quality, and content of the science and technology (S&T) program. Furthermore, it ensures that the technology being developed is affordable and minimizes system development risk. The DTA program conducts assessments and analyses to ensure maximum utilization of research and development funds to accomplish the overall objectives of the S&T program. Funds are required for technical, analytical, management support, travel, and publications.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: DoD Technology Analysis	5.707	5.525	4.705
Description: The Defense Technology Analysis (DTA) project provides engineering, scientific, and analytical support to the Office of the Deputy Assistant Secretary of Defense for Research (ODASD(R)) in its responsibility for direction, overall quality, and content of the science and technology (S&T) program. Furthermore, it ensures that the technology being developed is affordable and minimizes system development risk.			
FY 2015 Accomplishments: Provided engineering, scientific, analytical, and managerial support to the ODASD(R) in: • Developed strategies, plans, and policies to develop and exploit technology; • Conducted technology analyses, made recommendations, and developed guidance for S&T plans and programs; • Reviewed acquisition programs and made recommendations to optimize effectiveness of the DoD investments; • Supported oversight of S&T issues and initiatives, and responded to Congressional special interests.			
FY 2016 Plans: Provide engineering, scientific, analytical, and managerial support to the ODASD(R) in: • Developing strategies, plans, and policies to develop and exploit technology; • Conducting technology analyses, making recommendations, and developing guidance for S&T plans and programs; • Reviewing acquisition programs and making recommendations to optimize effectiveness of the DoD investments; • Oversight of S&T issues and initiatives, and responding to Congressional special interests.			
FY 2017 Plans: Provide engineering, scientific, analytical, and managerial support to the ODASD(R) in:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*	**Project (Number/Name)** P797 / *Defense Technology Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Developing strategies, plans, and policies to develop and exploit technology; • Conducting technology analyses, making recommendations, and developing guidance for S&T plans and programs; • Reviewing acquisition programs and making recommendations to optimize effectiveness of the DoD investments; • Oversight of S&T issues and initiatives, and responding to Congressional special interests.			
Accomplishments/Planned Programs Subtotals	5.707	5.525	4.705

	FY 2015	FY 2016
Congressional Add: Assessment of Major Weapon System Cyber Vulnerabilities	-	100.000
FY 2016 Plans: Conduct an assessment of cyber vulnerabilities in major weapons systems. These funds will be reprogrammed to the Assistant Secretary of Defense for Acquisition (ASD(A)) for execution.		
Congressional Adds Subtotals	-	100.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Several indicators allow the Department to measure the success of the DTA program element. The number of efforts funded and completed satisfactorily, and the OASD(R&E) influence on S&T program decisions, serve as valuable indicators of the program's effectiveness. Feedback into the oversight mechanisms of the program to guide investment decisions serve as additional metrics.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / *Defense Technology Analysis*	Project (Number/Name) P798 / *Defense Support Teams*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P798: *Defense Support Teams*	-	1.480	1.468	2.116	-	2.116	2.288	2.397	2.422	2.469	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Department's key expertise for reviewing and guiding research and engineering (R&E) programs resides in the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)). The OASD(R&E) staff augments their responsibilities through connections to technology experts in various fields throughout academia, industry, and government. The Defense Support Teams project supports the directed responsibilities, by building teams of technology experts, to conduct program technical health check-ups. The teams analyze the key engineering problem areas and offer adjustments in the development and test plans; alternate technical approaches; or new technologies that could enable successful development. The teams provide unbiased reviews, and gather advice from the Nation's leading technical experts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Support Teams	1.480	1.468	2.116
Description: The Defense Support Teams project supports the directed responsibilities by building teams of technology experts to conduct program technical health check-ups. The teams analyze the key problem areas, and offer adjustments in the development plans; alternate technical approaches; or new technologies that could enable successful development. The teams provide unbiased reviews, and gather advice from the Nation's leading technical experts. ***FY 2015 Accomplishments:*** Established support teams, and conducted technology analyses to support R&E program investment decisions. For selected acquisition programs and efforts, reviewed in technical detail the respective program issues, and offered technical solutions to program managers. Assessed the maturity of technologies that are candidates for transition to acquisition programs. ***FY 2016 Plans:*** Establish support teams, and conduct technology analyses to support R&E program investment decisions. For selected acquisition programs and efforts, review in technical detail the respective program issues, and offer technical solutions to program managers. Assess the maturity of technologies that are candidates for transition to acquisition programs. ***FY 2017 Plans:*** Establish support teams, and conduct technology analyses to support R&E program investment decisions. For selected acquisition programs and efforts, review in technical detail the respective program issues, and offer technical solutions to program managers. Assess the maturity of technologies that are candidates for transition to acquisition programs.			
Accomplishments/Planned Programs Subtotals	1.480	1.468	2.116

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*	**Project (Number/Name)** P798 / *Defense Support Teams*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Several indicators allow the Department to measure the success of the Defense Technology Analysis (DTA) PE. The number of technological introspections, as evidenced by completed support teams and OASD(R&E) influence on acquisition decisions, serve as valuable indicators of the program's effectiveness. The establishment and outputs of Defense Support Teams are additional indicators of program metrics. Feedback into the oversight mechanisms of the science and technology (S&T) program, to guide investment decisions, serve as additional metrics.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / *Defense Technology Analysis*	Project (Number/Name) P579 / *Critical Technology Assessments*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P579: *Critical Technology Assessments*	-	0.584	0.799	1.202	-	1.202	1.322	1.426	1.440	1.468	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Critical Technology Assessments provide the technical reference guidance in support of development and implementation of DoD technology security policies on international transfers of defense related goods, services, and technologies. The export control program provides an ongoing assessment and analysis of global goods and technologies. Determines significant advances in the development, production, and use of military capabilities by potential adversaries. Determines goods and technologies being developed worldwide with potential to significantly enhance or degrade U.S. military capabilities in the future. Identified in the Export Administration Act of 1979, and extended by Presidential Executive Order, to review militarily critical goods and technologies, and to consider worldwide technology capabilities. The Militarily Critical Technologies List (MCTL) is a congressionally mandated source document for identification of leading edge and current technologies monitored worldwide for national security, nonproliferation control of weapons of mass destruction, and advanced conventional weapons.

Specific activities include:
- Monitor and assess dual-use and military technologies worldwide.
- Assist in the development of proposals for negotiation in various multilateral export control regimes.
- Provide limited worldwide technology capability assessments for the MCTL and other U.S. international critical technologies efforts.
- Identify and determine technical parameters for proposals for international control of weapons of mass destruction.
- Identify foreign technologies of interest to the DoD and opportunities for international cooperative research and development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Critical Technology Assessments	0.584	0.799	1.202
Description: Critical Technology Assessments provide the technical reference guidance in support of development and implementation of DoD technology security policies on international transfers of defense related goods, services, and technologies. The export control program provides an ongoing assessment and analysis of global goods and technologies. Determines significant advances in the development, production, and use of military capabilities by potential adversaries. Determines goods and technologies being developed worldwide with potential to significantly enhance or degrade U.S. military capabilities in the future.			
FY 2015 Accomplishments: - Maintained technical interface to technology security organizations and functions. - Maintained interface with user community for critical technology assessments.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*	**Project (Number/Name)** P579 / *Critical Technology Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Maintained prototype process and capability 'on the shelf', so-as-to enable the implementation of a DOD-wide technical reference, if required ***FY 2016 Plans:*** - Maintain technical interface to technology security organizations and functions. - Maintain interface with user community for critical technology assessments. - Continue development of automated technology identification prototype. - Maintain prototype process and capability 'on the shelf', so-as-to enable the implementation of a DOD-wide technical reference, if required. ***FY 2017 Plans:*** - Maintain technical interface to technology security organizations and functions. - Maintain interface with user community for critical technology assessments. - Continue development of automated technology identification prototype. - Maintain prototype process and capability 'on the shelf', so-as-to enable the implementation of a DOD-wide technical reference, if required.			
Accomplishments/Planned Programs Subtotals	0.584	0.799	1.202

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Currency of the user community of critical technology assessments.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / *Defense Technology Analysis*	Project (Number/Name) P102 / *Data Vulnerability Assessment and Analysis*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P102: *Data Vulnerability Assessment and Analysis*	-	1.657	6.107	11.472	-	11.472	13.540	14.439	14.512	14.798	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Most DoD technical information resides on unclassified networks where it is at risk of being targeted for cyber espionage campaigns. Protecting DoD unclassified controlled technical information is a high priority for the Department, and is critical to preserving intellectual property and competitive capabilities of our national industrial base. To maintain full confidence in our systems, the Department must also assess the effect the loss of this information has on our warfighting capabilities. DoD contractors who produce or access controlled technical information must incorporate security standards on their networks, and report cyber-intrusion incidents that result in the loss of this information. These requirements are important, but insufficient in the face of a determined adversary. The Department must take steps to understand the impacts of losses and rethink how we safeguard our capabilities. This information, while unclassified, includes data and intellectual property concerning defense systems requirements, concepts of operations, technologies, designs, engineering, systems production, and component manufacturing.

This project supports protection of unclassified controlled technical information, and analysis of losses, to determine consequences and appropriate requirements, acquisition, programmatic, and strategic courses of action.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Data Vulnerability Program	1.657	6.107	11.472
Description: The Data Vulnerability Assessment and Analysis project will establish a joint analysis capability to conduct comprehensive assessments of controlled unclassified technical information losses, and engaging acquisition and intelligence sources, to determine consequences and appropriate preventative/mitigation actions.			
FY 2015 Accomplishments: Prototyped an initial joint analysis concept of operations, and provided support for one to three net loss assessment cases. Case one consisted of an integrated blue and red assessment of compromised controlled unclassified technical information. End product contains a demonstration of linkages between Acquisition, Counterintelligence, Law Enforcement, and Intelligence Communities regarding net assessment of technical data losses. The net assessment identified potential new targets for further action. Additional protection mechanisms are being identified to inform program protection planning activities for capabilities affected by information targeted in the case. Case two is still in progress, and is attempting to identify linkage incorporating small business research efforts into acquisition programs.			
FY 2016 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605798D8Z / *Defense Technology Analysis*	**Project (Number/Name)** P102 / *Data Vulnerability Assessment and Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Continue to develop the joint analysis capability to support net loss assessments by enabling collaboration between the acquisition, intelligence, counterintelligence, law enforcement, and operations communities as called out in the, “Strengthen cybersecurity throughout the product lifecycle,” portion of the Better Buying Power 3.0 initiative, and the DoD Cyber Strategy. The FY 2016 effort will continue to demonstrate the ability of the joint analysis capability to scale; develop dynamic links with program protection planning activities; and demonstrate advanced analytic tools, coupled with identification of additional information feeds/ sources of data. ***FY 2017 Plans:*** Continue to identify and engage appropriate partnerships, especially between the acquisition community and the Intelligence Community/ Counterintelligence Community. These partnerships will continue FY 2016 efforts to develop dynamic links with program protection efforts, identify and apply resources to priority programs, and begin to anticipate proactive protection functions. In FY 2017, necessary policy and guidance will be matured to enable transition of the joint analysis capability to initial operational capability.			
Accomplishments/Planned Programs Subtotals	1.657	6.107	11.472

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The Data Vulnerability Assessment and Analysis metric is the number of completed cases.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605804D8Z / *Development Test & Evaluation*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	18.698	18.833	21.337	19.541	-	19.541	20.610	20.351	20.539	20.881	Continuing	Continuing
P804: *Development Test & Evaluation*	18.698	18.833	21.337	19.541	-	19.541	20.610	20.351	20.539	20.881	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) establishes the dedicated funding line to carry out the duties as described in Title 10 US Code, Section 139, the Weapons Systems Acquisition Reform Act of 2009. The Deputy Assistant Secretary of Defense for Development Test and Evaluation (DASD(DT&E)) is the principal advisor to the Secretary of Defense, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) and the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) on Development Test and Evaluation (DT&E) in the Department of Defense (DoD).

The DT&E program element is budgeted in the Research Development Test and Evaluation (RDT&E) budget activity to support and improve the DT&E efforts of Major Defense Acquisition Program (MDAP), Major Automated Information System (MAIS), and other Special Interest (SI) acquisition programs designated by USD(AT&L) as they progress through the acquisition/development lifecycle; assess the DT&E capabilities of the Military Departments and DoD Components; oversee the Test and Evaluation (T&E) career field of the defense acquisition workforce; develop policy and guidance for the conduct of DT&E within the DoD; and prepare the annual DT&E report to Congress.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	19.160	17.371	17.066	-	17.066
Current President's Budget	18.833	21.337	19.541	-	19.541
Total Adjustments	-0.327	3.966	2.475	-	2.475
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.620	-			
• Internal Realignment for Increased Analytical Support	-	-	3.000	-	3.000
• FY15 Reprog. for Cancelled Account	-0.007	-	-	-	-
• Other Reprogrammings	0.300	-	-	-	-
• FFRDC Reduction	-	-0.034	-	-	-
• Efficiency Reductions	-	-	-0.371	-	-0.371

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense				Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*		**R-1 Program Element (Number/Name)** PE 0605804D8Z / *Development Test & Evaluation*			
• Economic Assumptions	-	-	-0.154	-	-0.154

Change Summary Explanation

FY 2017 internal realignment is provided for increased analytical resources to support acquisition program milestone decisions.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605804D8Z / *Development Test & Evaluation*	Project (Number/Name) P804 / *Development Test & Evaluation*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P804: *Development Test & Evaluation*	18.698	18.833	21.337	19.541	-	19.541	20.610	20.351	20.539	20.881	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides for the assessment of the Developmental Test and Evaluation (DT&E) efforts of each Major Defense Acquisition Program (MDAP), Major Automated Information System (MAIS), and Special Interest (SI) acquisition programs as designated by USD(AT&L). It also provides for the assessment of DT&E capabilities of the Military Departments and DoD Components, oversees the Test & Evaluation (T&E) career field of the defense acquisition workforce, develops policy and guidance for the conduct of DT&E within DoD, and produces the annual DT&E report to Congress. Specific activities include the following:

- Work with MDAP/MAIS/SI Program Managers, Chief Developmental Testers, and Lead DT&E Organizations to develop a comprehensive DT&E strategy that supports acquisition decision milestones. Ensure that the test strategy beginning at Milestone A, is documented in the Test and Evaluation Master Plans (TEMPs). The Deputy Assistant Secretary of Defense (DASD) DT&E also approves or disapproves the developmental test and evaluation plans in the TEMPs.
- Coordinate with the Director of Systems Engineering (SE) to ensure that the DT&E activities of the DoD are fully integrated into, and consistent with, the SE and development planning processes of the Department.
- Provide formal DT&E Assessments prior to major milestone decisions to inform the acquisition decision-makers on the readiness of programs to release the Engineering and Manufacturing Development (EMD) Request For Proposal (RFP) pre Milestone B, and begin production, Milestone C, with the goal of reducing discovery of performance issues later in the acquisition cycle.
- Participate in Nunn-McCurdy certification review teams.
- Develop policy and guidance to ensure efficient and effective DT&E across DoD, including policy and guidance for developmental testing of interoperability and Cybersecurity in coordination with the Joint Staff and DoD Chief Information Officer (CIO).
- Review the organizations and capabilities of the military departments, with respect to developmental test and evaluation, and identify needed changes or improvements to such organizations and capabilities. Provide input regarding needed changes or improvements for the test and evaluation strategic plan developed by Test Resource Management Center (TRMC).
-As the T&E Functional Leader, establish, oversee, and maintain the education, training and experience requirements including competencies and certification standards to enhance T&E acquisition workforce. Monitor and facilitate Defense Acquisition University (DAU) updates of T&E courses to ensure the curriculum supports the certification standards and provides the appropriate education and training.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Developmental Test and Evaluation	18.833	21.337	19.541
Description: This program supports and improves the DT&E efforts of Major Defense Acquisition Program (MDAP), Major Automated Information System (MAIS), and other Special Interest (SI) acquisition programs designated by USD(AT&L) as			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605804D8Z / *Development Test & Evaluation*	**Project (Number/Name)** P804 / *Development Test & Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
they progress through the acquisition/development lifecycle; assess the DT&E capabilities of the Military Departments and DoD Components; oversee the Test and Evaluation (T&E) career field of the defense acquisition workforce; develop policy and guidance for the conduct of DT&E within the DoD; and prepare the annual DT&E report to Congress. ***FY 2015 Accomplishments:*** -Worked with MDAP/MAIS/SI Program Managers, Chief Developmental Testers, and Lead DT&E organizations to improve DT&E planning through the development of disciplined Evaluation Framework Matrixes and the use of Scientific Test and Analysis Techniques (STAT). -Continued to implement the DASD(DT&E) 'Shift Left' philosophy that focuses on ensuring T&E strategies are developed in advance of releasing Technology Maturation and Risk Reduction (TMRR) and EMD RFPs, and increasing the amount and quality of data available to support production decisions with specific focus on CyberSecurity, interoperability, and reliability. -Worked with MDAP/MAIS Program Managers to develop comprehensive DT&E strategies to support capability development and weapon system acquisition. -Reviewed and approved all TEMPs submitted to support major acquisition reviews for MDAPs. Ensured DT&E planning is complete prior to the start of DT&E activities. -Completed the FY 2014 DT&E Annual Report to Congress that provided an assessment of MDAP DT&E progress and assesses the T&E workforce. Begin development of the FY 2015 Annual Report to Congress. -Refined DT&E policies and methodologies addressing DT&E across all MDAP, MAIS and SI programs. In concert with DASD(SE), DASD(Command, Control and Communications (C3)/Cyber), and Director, Operational Test and Evaluation (DOT&E), developed a guidebook to help Program Managers and their staffs integrate cybersecurity risk management into their programs throughout the system lifecycle. This guide includes specific guidance on how to integrate cybersecurity assessment activities with developmental test and evaluation activities. -Developed a charter for the Interoperability Test & Evaluation Panel (ITEP). This panel will oversee how test and evaluation processes are implemented by the Components. -Published DT&E data-based system performance assessments to support Defense Acquisition Board (DAB) review of MDAP and MAIS programs proceeding to major milestones. -Promoted the application of sound DT&E and related technical disciplines across the Department's acquisition community and programs. -Sustained the Scientific Test and Analysis Techniques Center of Excellence (STAT COE). ***FY 2016 Plans:*** -Work with MDAP/MAIS/SI Program Managers, Chief Developmental Testers, and Lead DT&E organizations to improve DT&E planning through the development of disciplined Evaluation Framework Matrixes and the use of STAT.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605804D8Z / *Development Test & Evaluation*	**Project (Number/Name)** P804 / *Development Test & Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
-Continue to implement the DASD(DT&E) 'Shift Left' philosophy that focuses on ensuring T&E strategies are developed in advance of releasing TMRR and EMD RFPs, and increasing the amount and quality of data available to support production decisions with specific focus on CyberSecurity, interoperability, and reliability. -Work with MDAP/MAIS Program Managers to develop comprehensive DT&E strategies to support capability development and weapon system acquisition. -Review and approve all TEMPs submitted to support major acquisition reviews for MDAPs. Ensure DT&E planning is complete prior to the start of DT&E activities. -Complete the FY 2015 DT&E Annual Report to Congress that provides an assessment of MDAP DT&E progress and assesses the T&E workforce. Begin development of the FY 2016 Annual Report to Congress. -Refine DT&E policies and methodologies addressing DT&E across all MDAP, MAIS and SI programs. -Publish DT&E data-based system performance assessments to support Defense Acquisition Board (DAB) review of MDAP and MAIS programs proceeding to major milestones. -Promote the application of sound DT&E and related technical disciplines across the Department's acquisition community and programs. -Work with the Services to identify funding to sustain the Scientific Test and Analysis Techniques Center of Excellence (STAT COE).			
FY 2017 Plans: -Work with MDAP/MAIS/SI Program Managers, Chief Developmental Testers, and Lead DT&E organizations to improve DT&E planning through the development of disciplined Evaluation Framework Matrixes and the use of STAT. -Continue to implement the DASD(DT&E) 'Shift Left' philosophy that focuses on ensuring T&E strategies are developed in advance of releasing TMRR and EMD RFPs, and increasing the amount and quality of data available to support production decisions with specific focus on CyberSecurity, interoperability, and reliability. -Work with MDAP/MAIS Program Managers to develop comprehensive DT&E strategies to support capability development and weapon system acquisition. -Review and approve all TEMPs submitted to support major acquisition reviews for MDAPs. Ensure DT&E planning is complete prior to the start of DT&E activities. -Complete the FY 2016 DT&E Annual Report to Congress that provides an assessment of MDAP DT&E progress and assesses the T&E workforce. Begin development of the FY 2017 Annual Report to Congress. -Refine DT&E policies and methodologies addressing DT&E across all MDAP, MAIS and SI programs. -Publish DT&E data-based system performance assessments to support Defense Acquisition Board (DAB) review of MDAP and MAIS programs proceeding to major milestones.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605804D8Z / *Development Test & Evaluation*	**Project (Number/Name)** P804 / *Development Test & Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
-Promote the application of sound DT&E and related technical disciplines across the Department's acquisition community and programs.			
Accomplishments/Planned Programs Subtotals	18.833	21.337	19.541

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

• Engaged and conducted oversight on all AT&L-designated MDAP, MAIS, and SI Programs.
• Advised at Defense Acquisition Board (DAB), Overarching Integrated Product Teams (OIPT), and Nunn-McCurdy Reviews.
• Reviewed and approved Test and Evaluation Master Plans (TEMPs) for MDAP, MAIS, and AT&L-designated Special Interest programs.
• Prepared formal DT&E assessments to inform Acquisition decision makers of readiness to enter EMD or begin Low Rate Initial Production.
• Implemented the education requirements for the T&E career field to require a hard science degree to support the T&E of increasingly more complex systems.
• Participated in the development of a major revision to the DoDI 5000.02.
• Supported OSD led Peer Reviews.
• In concert with DASD(SE), DASD(C3/Cyber), and DOT&E, developed a guidebook to help Program Managers and their staffs integrate cybersecurity risk management into their programs throughout the system lifecycle.
• The Scientific Test and Analysis Techniques Center of Excellence (STAT COE) supported development of disciplined test strategies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606100D8Z / *Budget and Program Assessments*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	18.577	4.030	4.116	4.014	-	4.014	4.159	4.205	4.265	4.348	Continuing	Continuing
101: *Budget and Program Assessments*	18.577	4.030	4.116	4.014	-	4.014	4.159	4.205	4.265	4.348	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports the Office of the Director, Cost Assessment & Program Evaluation (CAPE). It funds assessments that help to resolve budget and programmatic issues across the full range of the Department's activities. Projects that support this effort help to inform the leadership on program alternatives, capability concept development, design and cost, the appropriate balance of capabilities across the force, and also to identify how well the Department's expenditures are meeting its goals, and how well the force can implement the Defense strategy.

This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance the senior leadership's deliberations and decision-making.

This program provides the scientific and technical engineering services needed for research studies in the development of models and simulations and the evaluation of current analytical tools and scientific methods used to evaluate and assess weapons systems and warfighting capabilities for warfighting environments and scenarios, and related force structure. Deliverables from this program will include reports, briefings, and analyses designed to illuminate critical issues facing the Department. Outcomes include recommendations for new modeling techniques, programmatic alternatives, and scenario development.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	4.093	4.123	4.161	-	4.161
Current President's Budget	4.030	4.116	4.014	-	4.014
Total Adjustments	-0.063	-0.007	-0.147	-	-0.147
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.002	-			
• SBIR/STTR Transfer	-0.061	-			
• FY 2017 Fiscal Guidance Reduction	-	-	-0.014	-	-0.014
• FY 2016 FFRDC Reduction	-	-0.007	-	-	-
• SRRB Reduction (BA-06)	-	-	-0.083	-	-0.083

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense				Date: February 2016	
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*		**R-1 Program Element (Number/Name)** PE 0606100D8Z / *Budget and Program Assessments*			
• Economic Assumptions (EA-008)	-	-	-0.050	-	-0.050

Change Summary Explanation

Program internally realigned to achieve efficiencies and better align with Department priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606100D8Z / *Budget and Program Assessments*	Project (Number/Name) 101 / *Budget and Program Assessments*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
101: *Budget and Program Assessments*	18.577	4.030	4.116	4.014	-	4.014	4.159	4.205	4.265	4.348	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program supports the Office of the Director, Cost Assessment & Program Evaluation (CAPE). It funds assessments that help to resolve budget and programmatic issues across the full range of the Department's activities. Projects that support this effort help to inform the leadership on program alternatives, capability concept development, design and cost, the appropriate balance of capabilities across the force, and also to identify how well the Department's expenditures are meeting its goals, and how well the force can implement the Defense strategy.

This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance DoD senior leadership's deliberations and decision-making.

This program provides the scientific and technical engineering services needed for research studies in the development of models and simulations and the evaluation of current analytical tools and scientific methods used to evaluate and assess weapons systems and warfighting capabilities for warfighting environments and scenarios, and related force structure. Deliverables from this program will include reports, briefings, and analyses designed to illuminate critical issues facing the Department. Outcomes include recommendations for new modeling techniques, programmatic alternatives, and scenario development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: OSD Support for Programming Budget	4.030	4.116	4.014
Description: This program provides for analytical research across a spectrum of issues and concerns. The research agenda is focused on near to long-term problems identified by the Secretary of Defense, and addresses difficult and complex questions linked to program alternatives for current and future capabilities and forces in order to enhance senior leadership deliberations and decision-making. ***FY 2015 Accomplishments:*** - Evaluated and upgraded the cost analysis tools used to inform program, budget, and Defense Acquisition Board reviews. - Analyzed war-fighting and joint operations to support major defense reviews, including transformation initiatives, force and weapons systems requirements, and Analyses of Alternatives (AoAs) to support major acquisition decisions; land forces, including the manning, equipping, training, sustaining, and fielding of these forces with special emphasis on the resources needed to accomplish these activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606100D8Z / *Budget and Program Assessments*	**Project (Number/Name)** 101 / *Budget and Program Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Analyzed mobility requirements and modernization decisions for airlift aircraft, sealift vessels, and tankers in support of the defense strategy; force structure and investment decisions for pre-positioning ashore and afloat and the impact of forward presence postures. - Evaluated scenarios for reducing logistics vulnerabilities to include evaluation of threat databases, demographics, and technological trends, Developed determinations of impact on national security resources. - Analyzed scenarios of national security interest to support transformation initiatives. - Evaluated medical cost growth to reliably forecast costs for budgeting using the tool developed to evaluate the impact of alternative benefit structures and policies on future costs. - Analyzed alternative cyber defense strategies to improve the cyber security and mission assurance of the Department of Defense by supporting training objectives and scenarios and advocating for and assisting in the development of a data-driven analysis. - Created, modified, and supported a wargaming repository. - Analyzed Overseas Contingency Operations (OCO) funding data to determine how funding was actually spent as distinguished from DoD base budget resources. Provided normalization information that can be applied to existing Defense Resources Data Warehouse (DRDW) data. - Analyzed sexual assault investigations from Service Military Criminal Investigative Organizations to identify programs that can be developed or expanded to mitigate the problem.			
FY 2016 Plans: - Continue to evaluate and upgrade the cost analysis tools used to inform program, budget, and Defense Acquisition Board reviews. - Continue to analyze war-fighting and joint operations to support major defense reviews, including transformation initiatives, force and weapons systems requirements, and AoAs to support major acquisition decisions; land forces, including the manning, equipping, training, sustaining, and fielding of these forces with special emphasis on the resources needed to accomplish these activities. - Continue to analyze mobility requirements and modernization decisions for airlift aircraft, sealift vessels, and tankers in support of the defense strategy; force structure and investment decisions for pre-positioning ashore and afloat and the impact of forward presence postures. - Continue to evaluate scenarios for reducing logistics vulnerabilities to include evaluation of threat databases, demographics, and technological trends; and develop strategies to reduce the impact of national security resources. - Analyze scenarios of national security interest to support transformation initiatives. - Continue to improve medical cost growth forecasting methodology to reliably forecast costs for budgeting using the tool developed to evaluate the impact of alternative benefit structures and policies on future costs.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606100D8Z / *Budget and Program Assessments*	**Project (Number/Name)** 101 / *Budget and Program Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Continue to analyze alternative cyber defense strategies to improve the cyber security and mission assurance of the Department of Defense by supporting training objectives and advocating for and assisting in the development of a data-driven analysis. - Continue to create, modify, and support a wargaming repository. - Continue to analyze Overseas Contingency Operations (OCO) funding data to determine how funding was actually spent as distinguished from DoD base budget resources. Update normalization information that can be applied to existing Defense Resources Data Warehouse (DRDW) data. - Continue to analyze sexual assault investigations from Service Military Criminal Investigative Organizations to identify programs that can be developed or expanded to mitigate the problem. ***FY 2017 Plans:*** Studies, analyses, and assessments will be focused on: - Improving cost analysis tools to inform program, budget, and Defense Acquisition Board reviews. - In support of the Weapon System Acquisition Reform Act (WSARA), independently assessing, analyzing, and where appropriate, updating cost indices, inflation rates, and escalation rates used in preparing the President's Budget for major acquisition programs. - Developing, assessing, and enhancing databases that provide cost data for major weapon systems. - Improving estimates produced by the Defense Employment and Purchases Projection System (DEPPS) and Defense Translator, which are used to support decision briefs to the President, Congress, Secretary of Defense, and Deputy Secretary of Defense. - Modeling and analyzing aircraft survivability against various threat detection approaches and in various operational environments. Assessing the ability of aircraft and weapons to operation in anti-access/area denial regions. - Modeling of logistical vulnerabilities against various threats and in various operational environments. Assessing the cost and mission effectiveness of proposed improvements. - Modifying, and supporting a wargaming repository. - Analyzing OCO funding data to determine how funding was actually spent as distinguished from DoD base budget resources. Provide normalization information that can be applied to existing Defense Resources Data Warehouse (DRDW) data for the current budget position. - Developing scenarios and modeling for mobile intelligence targets. - In support of the Defense Strategic Guidance, analyzing programs to assess alternative platforms; examining the cost of all mission alternatives and acquisition strategies.			
Accomplishments/Planned Programs Subtotals	4.030	4.116	4.014

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606100D8Z / *Budget and Program Assessments*	**Project (Number/Name)** 101 / *Budget and Program Assessments*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

A mix of competitive contracts with commercial firms and research provided by university-affiliated research centers (UARCs), and Federally Funded Research and Development Centers (FFRDCs).

E. Performance Metrics

The products or expected outcomes of this program are studies and analyses to support resource allocation decisions, major defense acquisition decisions, and issues of high interest to the Secretary of Defense. Performance is measured by the quality of the analyses and is monitored through the review of the organizational assessment process. The primary goal is to ensure that study and analytical products are timely, clear, complete, accurate, responsive, balanced, and objective.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0203345D8Z / *Defense Operations Security Initiative*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	5.161	1.900	1.943	2.072	-	2.072	2.685	3.321	3.364	3.430	Continuing	Continuing
345: *Defense Operations Security Initiative*	5.161	1.900	1.943	2.072	-	2.072	2.685	3.321	3.364	3.430	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Operations Security (OPSEC) Initiative (DOSI) is an effort to enhance Department of Defense (DoD) Operations Security capability and capacity across the DoD. DOSI executes Research, Development, Test, and Evaluation (RDT&E) to develop OPSEC technologies and tools to support Department activities which include denial of adversary collection, blue force countermeasures, and blue force counter analysis.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	1.952	1.946	2.409	-	2.409
Current President's Budget	1.900	1.943	2.072	-	2.072
Total Adjustments	-0.052	-0.003	-0.337	-	-0.337
• Congressional General Reductions	-	-0.003			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.050	-			
• Departmental Adjustments	-0.002	-	-0.337	-	-0.337

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Operations Security Initiative	1.900	1.943	2.072
FY 2015 Accomplishments: - Researched, developed and tested signature management and OPSEC technologies to support Combatant Command (CCMD) and/or DoD Component requirements aligned with National Security challenges. Investments provide signature emulation capabilities for utilization in OPSEC planning and execution. - Ensured developed prototypes and capabilities transitioned into formalized program offices and program executive offices across DoD Components.			
FY 2016 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0203345D8Z / *Defense Operations Security Initiative*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Research, Develop and test signature management and OPSEC technologies to support CCMD and/or DoD Component requirement that enable planning at strategic and operatonal levels. - Ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Components. - Assess historic RDT&E investments to identify Return On Invest (ROI) metrics on DoD OPSEC capability and capacity progression. ***FY 2017 Plans:*** - Will continue to research, develop and test signature management and OPSEC technologies to support CCMD and/or DoD Component requirements. - Will continue to ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Components. - Will continue to assess historic RDT&E investments to identify ROI metrics on DoD OPSEC capability and capacity progression.			
Accomplishments/Planned Programs Subtotals	1.900	1.943	2.072

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0203345D8Z O&M DW: *Defense Operations Security Initiative*	4.515	3.698	3.863	-	3.863	4.070	4.192	4.177	4.255	Continuing	Continuing

Remarks

E. Acquisition Strategy

The acquisition, management, and contracting strategy involves the following:
• Adhere to guidance outlined in DoD 5000, Directive 7, Federal Acquisition Regulations (FAR), and FAR Supplement Policies and Procedures.
• RDT&E OPSEC capabilities, systems, tools, products and services through a disciplined, yet agile, process that ensures signature management and signature obfuscation capabilities are available for DoD components.
• Sustain an acquisition process that is responsive and responsible to internal and external customers and stakeholders.
• Continue to support the warfighter's need for capabilities that dominate today's dynamic, networked battlespace by providing strategy across the DoD for the planning and execution of OPSEC.

F. Performance Metrics

RDT&E performance metrics are used to establish baseline and assess progress toward enhancement and increase of OPSEC capabilities and capacities across the DoD's assigned responsibilities. The following metrics are based on the ROI of RDT&E investments and provide assessment to meeting:

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0203345D8Z / *Defense Operations Security Initiative*

1) operational requirements for OPSEC capabilities, 2) technical requirements for successful engineering, and 3) programmatic requirements for sustaining RDT&E successes across the Department:

- Seventy percent of evaluations and tests on engineered prototypes and next generation capabilities address CCMD and/or DoD Component requirements. The remaining thirty percent serve as the pivot to improve service level operational capabilities or to address alternate technologies.
- One hundred percent of completed prototype development includes affiliated specifications, architecture, raw material inventories and documentation. They are maintained in a centralized database repository used to support feedback and future efforts.
- Fifty percent of prototypes and next generation capabilities transition into DoD Component Program Management Offices and Program Executive Offices to fulfill DoD urgent needs, while the remaining fifty percent are reviewed for alternative operational utility and sent to the appropriate Service or Agency for application.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.971	0.916	-	0.916	1.059	1.125	1.140	1.162	Continuing	Continuing
891: *Defense Military Deception Program*	0.000	0.000	0.971	0.916	-	0.916	1.059	1.125	1.140	1.162	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Military Deception Program (DMDP) is an effort to revitalize Department of Defense (DoD) Military Deception (MILDEC) capability and capacity across the DoD. DMDP executes Research, Development, Test, and Evaluation (RDT&E) on MILDEC capabilities, next generation devices, and technologies to support emerging Department requirements. DMDP integrates RDT&E prototypes with DoD Component Programs for acquisition, sustainment and maintenance.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.971	1.005	-	1.005
Current President's Budget	0.000	0.971	0.916	-	0.916
Total Adjustments	0.000	0.000	-0.089	-	-0.089
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-	-	-0.089	-	-0.089

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Military Deception Program Office	-	0.971	0.916
FY 2016 Plans: - Research, develop and test two high-fidelity next generation decoys and capabilities to meet Combatant Commands (CCMD) and DoD Component MILDEC requirements. - Develop technology feasibility reports on potential deception threats to U.S. systems. - Ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Service Components.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Execute a use case, in coordination with Army, through JCIDS for MILDEC requirement contextualization for a pre-milestone A acquisition package. - Participate in Defense RDT&E processes to advance basic and applied research, science and technology, and technology development and testing to elevate MILDEC capability and capacity across the Department. ***FY 2017 Plans:*** - Will continue to research, develop and test high-fidelity next generation decoys and capabilities to meet CCMD and DoD Component MILDEC requirements. - Will continue to develop technology feasibility reports on potential deception threats to U.S. systems. - Will continue to ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Components. - Will continue to participate in Defense RDT&E processes to advance basic and applied research, science and technology, and technology development and testing to elevate MILDEC capability and capacity across the Department.			
Accomplishments/Planned Programs Subtotals	-	0.971	0.916

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0303260D8Z O&M DW: *Defense Military Deception Program Office*	3.805	3.114	2.623	-	2.623	2.365	2.493	2.510	2.558	Continuing	Continuing

Remarks

N/A

E. Acquisition Strategy

The acquisition, management, and contracting strategy involves the following:
• Adhere to guidance outlined in DoD 5000, Directive 7, Federal Acquisition Regulations (FAR), and FAR Supplement Policies and Procedures.
• Acquire and sustain MILDEC capabilities, systems, tools, products and services through a disciplined, yet agile, process that ensures information related capabilities are available for DoD components.
• Sustain an acquisition process that is responsive and responsible to internal and external customers and stakeholders.
• Continue to support the warfighter's need for capabilities that dominate today's dynamic, networked battlespace by providing governance, oversight and strategy across the DoD for the planning and execution of MILDEC activities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

F. Performance Metrics

RDT&E performance metrics are among the metrics used to establish the baseline and assess progress toward revitalization of MILDEC capabilities and capacities across the DoD's assigned responsibilities. The following metrics are based on the return on investment of RDT&E investments and provide assessment to meeting: 1) operational requirements for MILDEC capabilities, 2) technical requirements for successful engineering, and 3) programmatic requirements for sustaining RDT&E successes across the Department:

Performance metrics are measured through an increase of MILDEC capability and capacity as demonstrated by the following:
- Seventy percent of evaluations and tests on engineered prototypes and next generation capabilities address CCMD and/or DoD Component requirements. The remaining thirty percent serve as the pivot to improve service level operational capabilities or to address alternate technologies.
- One hundred percent of completed prototype development includes affiliated specifications, architecture, raw material inventories and documentation. They are maintained in a centralized database repository used to support feedback and future efforts.
- Fifty percent of prototypes and next generation capabilities transition into DoD Component Program Management Offices and Program Executive Offices to fulfill DoD urgent needs, while the remaining fifty percent are reviewed for alternative operational utility and sent to the appropriate Service or Agency for application.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0305193D8Z / *Cyber Intelligence*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	7.586	6.735	6.567	18.523	-	18.523	18.992	19.427	19.528	19.676	Continuing	Continuing
001: *Cyber and Intelligence Integration*	7.586	6.735	6.567	18.523	-	18.523	18.992	19.427	19.528	19.676	Continuing	Continuing

A. Mission Description and Budget Item Justification

Cyber and Intelligence Integration (II) encompasses activities pertaining to operations support and intelligence integration, cyber technology innovation, intelligence and related activities in Cyberspace and strategic assessments. Cyber and II is part of the overall Department of Defense (DoD) effort to implement best practices and DoD doctrinal processes that require shared responsibility and close synchronization among intelligence, operations and associated planning elements. Joint Warfighter requirements are driving the need for the integration of capabilities across intelligence disciplines and seamlessly connecting them to operational capabilities/capacities. The objective of Cyber and II is the rapid experimentation and development of existing technologies (hardware, software, licenses, databases, analytics, etc.) to create new cyber capabilities and demonstrate their intelligence value in support of warfighter operations.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	6.738	6.579	6.723	-	6.723
Current President's Budget	6.735	6.567	18.523	-	18.523
Total Adjustments	-0.003	-0.012	11.800	-	11.800
• Congressional General Reductions	-	-0.012			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-0.003	-	11.800	-	11.800

Change Summary Explanation

FY 2017 increase in funding to expand focus and scope to include emerging technology solutions in support of Defense Intelligence Enterprise cyber and technical collection requirements and gaps. Increased program awareness resulted in over $100M worth of project proposals in FY 2016. This trend is expected to continue into the future. Additional funding would allow for a greater number of innovative projects to get funded and transitioned to operational use.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0305193D8Z / *Cyber Intelligence*	Project (Number/Name) 001 / *Cyber and Intelligence Integration*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
001: *Cyber and Intelligence Integration*	7.586	6.735	6.567	18.523	-	18.523	18.992	19.427	19.528	19.676	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber and II will integrate intelligence activities in the information/collaborative environment and Cyberspace with conventional and asymmetric military operations. Further, they will provide new/emerging technologies, methodologies and processes to increase the delivery of actionable intelligence from the Defense Intelligence Enterprise to the Warfighter.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Cyber and Intelligence Operations Integration	6.735	6.567	18.523
FY 2015 Accomplishments: Developed Cyber and II capabilities and capacity to support Combatant Commands (CCMDs), Combat Support Agencies (CSA) and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and II technologies that support warfighter needs.			
FY 2016 Plans: Develop Cyber and II capabilities and capacity to support CCMDs, CSAs and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and II technologies that support warfighter needs.			
FY 2017 Plans: Will continue to develop Cyber and II capabilities and capacity to support CCMDs, CSAs and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and II technologies that support warfighter needs. In addition will expand focus and scope to include emerging technology solutions in support of Defense Intelligence Enterprise cyber and technical collection requirements and gaps.			
Accomplishments/Planned Programs Subtotals	6.735	6.567	18.523

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0305193D8Z / *Cyber Intelligence*	**Project (Number/Name)** 001 / *Cyber and Intelligence Integration*

D. Acquisition Strategy

The Cyber and II acquisition, management and contracting strategy follows guidance outlined in the DoD 5000 series directives, Federal Acquisition Regulation (FAR) and FAR supplement policies and procedures. Management uses project management tools and meetings to ensure delivery of stated capabilities and performance criteria.

E. Performance Metrics

Performance metrics are measured through internal management controls and external assessments. Performance metrics include, but are not limited to, time, money, realism, fidelity, and transition as defined below:

- Time – Enable the warfighter to speed up processes faster than current capabilities allow.
- Money – Enable the warfighter to reduce duplication of effort and to prepare and execute events at a more effective and efficient cost than current capabilities allow.
- Realism – Enable the warfighter to create an environment that is closer to the real world environment than current capabilities allow.
- Fidelity – Ensure unity of efforts throughout the Cyber and II Communities.
- Transition - Select projects that have the greatest likelihood of transitioning into operational capabilities.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	157.609	38.266	42.679	34.384	-	34.384	46.241	44.659	42.071	42.063	Continuing	Continuing
758: *Joint National Training Capability (JNTC)*	82.524	24.118	31.031	25.611	-	25.611	34.205	33.033	31.052	31.044	Continuing	Continuing
761: *Joint Simulations Systems (JSS)*	13.261	1.889	2.255	0.000	-	0.000	0.000	0.000	0.000	0.000	0	17.405
769: *Joint Knowledge Development & Distribution Capability (JKDDC)*	12.981	3.811	3.867	3.210	-	3.210	4.482	4.329	4.108	4.108	Continuing	Continuing
770: *U.S. Forces Korea Training and Exercise Support*	30.047	3.861	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	33.908
701: *Air Force Joint National Training Capability (JNTC)*	7.185	2.339	2.701	2.242	-	2.242	3.130	3.024	2.869	2.869	Continuing	Continuing
772: *Navy Joint National Training Capability (JNTC)*	11.611	2.248	2.825	2.345	-	2.345	3.318	3.205	3.042	3.042	Continuing	Continuing
702: *JCATS/JTLS*	-	0.000	0.000	0.976	-	0.976	1.106	1.068	1.000	1.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

These programs support readiness of the joint force by creating a Joint Training Environment to replicate the complex and changing operational environment. The funding increase beginning in FY 2016 represents planned growth and internal reprogramming decisions to accelerate development of a cloud-enabled joint training environment. These investments directly support defense strategic guidance and enhance joint warfighting readiness by building training capabilities that support the operational readiness of the force. The elements associated with this coordinated effort consist of:

- Joint National Training Capability (JNTC)
- Joint Simulation System (JSS)
- Joint Knowledge Development & Distribution Capability (JKDDC)
- U.S. Forces Korea Training & Exercise Support (USFK)
- Air Force Joint National Training Capability (JNTC)
- Navy Joint National Training Capability (JNTC)

JNTC: The mission of the Joint National Training Capability (JNTC) program is to advance joint capabilities and interoperability by concentrating on emerging joint training requirements through collective training experiences using a managed set of globally distributed capabilities and activities. The program resources Service and

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0804767D8Z *I COCOM Exercise Engagement and Training Transformation (CE2T2)*

SOF joint training and enabling capabilities that improve interoperability and realism of tactical and operational joint training between the Services and USSOCOM. JNTC enables joint collective training for Combatant Commands and Services by developing relevant joint training content and ensuring global distributed access. The enabling capabilities support the Services and USSOCOM in their requirement to provide trained and ready forces in support of Combatant Command operational requirements. This program will focus efforts on improving, rather than consuming, readiness and create a ready surge force consistent with Chairman's guidance.

JSS: The Joint Simulation System (JSS) provides a low cost, distributed or deployable, web-based joint training capability with a small technical and operator footprint. The JSS funding provides warfighters with joint simulations and tools that enhance and enable Joint training across Services, Combatant Commands, Combat Support Agencies, NATO and multinational partners. The Joint simulations and tools provided by JSS funding are critical enablers that support the delivery of trained, capable, and interoperable joint forces. JSS's intent is to maintain a capability to share simulation environments with coalition partners.

JKDDC: Joint Knowledge Development & Distribution Capability (JKDDC) Joint Knowledge Online (JKO) is the JS J7 program of record for online joint training that implements and operationalizes the OSD T2 JKDDC. JKO directly supports the CE2T2 program by developing, delivering, tracking, and reporting online training for Combatant Command exercises; Combatant Command required training; doctrinally based Joint Operations Core Curriculum; multinational, coalition, IA training; and OSD required training (externally funded). JKO also expends funding for leading edge technology review, market research, and integration to directly enhance specific aspects of the training capability as required for J7 support to Combatant Commanders. JKO satisfies all requirements necessary to provide the CE2T2 stakeholders with a distributed learning capability and access to web-based training content.

USFK: FY 2015 is the last year for dedicated funding within the overall program. The U.S. Forces Korea (USFK) Training & Exercise Support program develops simulations capable of satisfying all joint exercise training requirements in the Korean Theater of Operations. Interoperability with the Republic of Korea-developed Korean Simulation System (KSIMS) is a critical and unique requirement of this USFK RDT&E program. This solution will be capable of interoperating in a common battle space that realistically represents the operating environment to all levels of training audiences -- tactical to strategic -- in Korean theater exercises. While supporting USFK's specific requirements, this solution will contain enhancements that will benefit other combatant commander training programs that use the aging Joint, Live, Virtual, and Constructive (JLVC) simulations and the emerging JLVC 2020 simulations.

Air Force JNTC: The Air Force JNTC funding provides a focused upgrade to develop models for space-based capabilities for integration into the JLVC environment. The Air Force supports development of cross-domain solutions that enable the integration of systems with disparate security requirements, and significantly increases the training audience to additional joint and coalition participants.

Navy JNTC: These funds enable the Navy to develop unique maritime capabilities that integrate JLVC elements into a seamless joint training environment. The Navy program activities include conducting research, development, test and evaluation, and cross-service architecture certification on joint-capable systems. Additionally, the program develops cross-domain architectures for U.S. and Coalition Forces and ensures sister service modeling/simulation and instrumentation efforts follow a unified standard.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0804767D8Z *I COCOM Exercise Engagement and Training Transformation (CE2T2)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	38.950	43.811	42.454	-	42.454
Current President's Budget	38.266	42.679	34.384	-	34.384
Total Adjustments	-0.684	-1.132	-8.070	-	-8.070
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-1.045			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.015	-0.087			
• SBIR/STTR Transfer	-0.669	-			
• Rephasing of funds	-	-	-8.070	-	-8.070

Change Summary Explanation

The decreased funding for the USFK program is attributed to the fact that the program is nearing completion and will no longer require RDT&E funding. Funding was realigned in FY 2016 to the O&M appropriation to support other priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 758 / *Joint National Training Capability (JNTC)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
758: *Joint National Training Capability (JNTC)*	82.524	24.118	31.031	25.611	-	25.611	34.205	33.033	31.052	31.044	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Investment in the Joint National Training Capability (JNTC) program will enable Service and Combatant Commands to train as they operate. The funding requested continues development of exercise Scenario Management Tools and services that support planning and execution of joint training, and continued maturation of a single integrating architecture for Joint Training. Funding supports the development of cloud-enabled modular training application services. Program intent is to reduce dependence on touch labor, and mitigate the impact of reductions in operation and sustainment funding. Focus must be maintained to deliver operationally relevant training environments and respond to changes in the warfighter's operational environment. JNTC enables the Department of Defense to be responsive to the warfighters' pace of changing operational concepts, threat environments, and best practices. In FY 2017, this investment continues expanding access for Service and Combatant Command trainers to plan and execute joint training. Funds support improved relevance and realism of training by providing capabilities that replicate the contemporary and future operating environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint National Training Capability (JNTC)	24.118	31.031	25.611
Description: JNTC provides the technical standards, architecture (blueprint), and development processes required to integrate/ link joint training programs. The Joint Training Environment is envisioned as an integrated network of training sites and nodes, and accessible joint training and force development services. By leveraging existing training programs and initiating specific actions, JNTC develops credible opposing force capabilities and expanded access to assets typically unavailable to the training audience. This enhances the integration of joint training objectives into Service training events. Funding in this account supports the technical integration of Joint and Service modeling and simulation training capabilities. Technical integration enables selective aggregation of training audiences at the Combatant Command, Joint Task Force, and Component Command Headquarter levels. The funding supports modernization of the Joint Training Environment (JTE) to increase warfighter access to automated training enablers within the Joint Training Synthetic Environment (JTSE) through web-based and cloud capabilities. The Adaptive Training Capability Program (ATCP) is a subordinate component of JNTC that enables the Joint Force to be responsive to the warfighters' pace of changing operational concepts, threat environments, and best practices. ATCP funding advances joint capabilities and interoperability by addressing emerging joint training requirements through a managed set of globally distributed JLVC enablers. ATCP funding promotes joint context to Service training programs and joint enablers			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 758 / *Joint National Training Capability (JNTC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

supporting Combatant Command training requirements and CJCS High Interest Training Issues identified in the Chairman's Annual Training Guidance.

FY 2015 Accomplishments:

• In accordance with Deputy Assistant Secretary of Defense (Readiness) (DASD(R)) direction to "Advance Joint Training Environment to exist within a future Joint Information Environment (JIE) and Data Center Consolidation Initiative," continued development and refinement of the JTE strategy, roadmap, and conceptual design working with the Services, Combatant Commands, Coalition partners, agencies, and the DoD modeling and simulation community to deliver a training environment reliant on cloud-enabled modular services with an initial operating capability in FY 2016, and full operating capability in FY 2022.
• Conducted JTSE (previously JLVC 2020) Integration Events with Services to prepare for limited operational capability release in December 2015.
• Initiated the transition to the objective JTE by developing the first JLVC web-accessible version allowing access to cloud-base modeling and simulation, networking, and information technology applications. Provided Combatant Commands and Services a more efficient and effective method in meeting joint training requirements. JTE Capabilities delivered at the end of FY 2015.
• Continued development of a capability that provides Combatant Command and Service consumers the ability to search for and download across the exercise network, exercise order of battle data from different data sources for initiating exercise modeling and simulation systems; expanded development into geospatial services.• Continued Service simulation integration by providing direction, specification, standards, and testing environments to enable the integration of Service, Joint Combatant Command, and Agency simulations, services, and tools.
• Completed development of a 3-D immersive virtual environment to facilitate a distributed collaboration environment.
• Developed a draft JIE Implementation Plan (I-Plan) to migrate the Suffolk data center to JIE. The plan consists of three main phases or Lines of Objective (LOO). LOO-1 establishes an initial operational capability (IOC) – Special Purpose Processing Node (SPPN) with secure connectivity to the JIE. LOO-1 test one of three was complete in March 2015. LOO-2 rationalizes and consolidates mission applications/systems. LOO-3 will reduce the combined J7 Data Center (DC) footprint, by performing consolidation and optimization, and evaluating hosting environments.
• Supported the DISA JIE Technical Support Office by co-chairing the SPPN Integrated Design Team with the mission to develop SPPN documentation and architectures for DoD-wide use.

FY 2016 Plans:

• IAW DASD(R) direction to "enhance adaptivity by implementing innovative collective/individual training," achieve JTE initial operating capability in FY 2016 to provide the home station user with initial ability to conduct small Joint Command Post simulation exercises and individual staff section simulation training at home stations.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 758 / *Joint National Training Capability (JNTC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Continue Service simulation integration by providing direction, specification, standards, and testing environments to enable the integration of Service, Joint Combatant Command and Agency simulations, services and tools. • Invest in Information Technology capabilities to support expected growth in home-station training Joint training enabler demand driven by returning forces, and a fiscally-driven adaptive training model that relies more heavily on home-station activities. • Continue development of JTE tools/services that support reduction in out-year training operations and sustainment costs, for planning, designing, provisioning and executing Combatant Command and Service joint training activities. • Develop cloud management services that provide on-demand, auto-initiated, and load balanced JTE services (i.e. data, simulation, planning tools, virtualize C2, etc.). • Develop a network planning service that allows the user to create the physical layout of the training domain (i.e. computer workstations, C2 Systems, Simulation Workstations, SIPR Machines, printers, etc.) being used for the exercise/event. • Continue to develop, finalize, and approve the J7 Suffolk JIE I-plan. Continue to develop LOO-1 secure connectivity test 2 and 3. Begin application consolidation and rationalization supporting LOO-2. Begin collaboration across J7 to define the requirement and identify LOO-3 data center consolidation opportunities. ***FY 2017 Plans:*** • Implement Theater Intelligence Collection services designed to allow players to capture audience Intelligence Collection plans. • Implement an Unconventional Warfare Service designed to capture Special Operations-centric shaping operations over longer duration for planning, designing, provisioning, and executing Combatant Command and Service joint training activities. • Continue to develop cloud management services that provide on-demand, auto-initiated, and load balanced JTE services (i.e. data, simulation, planning tools, virtualize C2, etc.). • Develop civilian infrastructure and population data services which represent reasonable effects of Civil-Military Operations and Information Operations in simulation. • Continue to align with the JIE.			
Accomplishments/Planned Programs Subtotals	24.118	31.031	25.611

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *JNTC O&M Funding*	25.732	36.341	35.880	-	35.880	35.865	35.308	34.328	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 758 / *Joint National Training Capability (JNTC)*

E. Performance Metrics

RDT&E development efforts are evaluated based on the performance metrics below. This ensures the Joint Force Trainer capabilities development effort synchronizes with warfighter requirements. Performance metrics include, but are not limited to; access, cost, realism, relevance and technology as defined below:

• Access – Develop design standards that enable participation across DoD and, as applicable, with Coalition Partners. Make the environment available to meet user demands.
• Cost – Enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow.
• Realism – Enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow.
• Relevance – Maintain operational relevance through adaptation to the changing operational environment.
• Technology – Sustain the training environment network through developments for distributed home station training that include modular cloud-enabled training services.

Measures:
•
• Conduct integration events with Services and gain enterprise consensus for publishable standards. (FY 2016)
• Initiate development of SOF unconventional warfare service (FY 2016)
• Develop individual staff section training (FY 2016)
• Increase the number of Order of Battle data sources accessible across the training network for search and download (FY 2016 and FY 2017)
• JTSE achieves Initial Operating Capability (FY 2016)
• Publish, revise, and update standards for developing JTE modular services (FY 2016/2017)
• Conduct at least one distributed training event from home station (FY 2016)

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 761 / *Joint Simulations Systems (JSS)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
761: *Joint Simulations Systems (JSS)*	13.261	1.889	2.255	0.000	-	0.000	0.000	0.000	0.000	0.000	0	17.405
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Simulation System (JSS) will decompose, harvest, and reuse DoD investment in joint simulations to develop cloud-enabled modular services (CEMS), reaching Initial Operating Capability in FY 2016. JSS will further development of existing Joint Conflict and Tactical Simulation (JCATS) and Joint Theater Level Simulation (JTLS) as required, to remain relevant and responsive to meet Combatant Command training requirements as the Joint Training Environment is implemented. JSS will provide design and development of web-based applications used as services in CEMS environment. FY 2016 is the last programmed year of funding for JSS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Simulation System (JSS)	1.889	2.255	-

Description: This effort provides warfighters with joint simulations and tools that enhance and enable Joint training across Services, Combatant Commands, agencies and coalition partners. These joint simulations and tools are part of an overall JLVC baseline of training capabilities. They represent a set of training enablers, and "certified systems" that are interoperable and acceptable for usage within the joint training environment. The joint simulations and tools provided by JSS are critical enablers that support the delivery of trained, capable, and interoperable Joint Forces.

FY 2015 Accomplishments:

• Sustained joint training capability using JTLS and JCATS to meet Combatant Command training requirements until the next generation of Joint Training Modeling and Simulation Federation is fielded with like-capabilities.
• Continued development of JCATS and JTLS to meet Combatant Command training requirement gaps during transition to Joint Training Modeling and Simulation Federation.
• Provided design and development of web-based applications used as services in cloud-based modular services environment.
• Provided Joint Training Modeling and Simulation Federation. Develop the service for the web-based Air Tasking Order Generator and an Air Tasking Order Translator that interfaces with the JLVC-2020 Runtime Database.
• Completed development of Tactical Electronic Intelligence (TAC ELINT) and Satellite Services.

FY 2016 Plans:

• Continue to develop/support JTLS and JCATS as a low cost, small support footprint, web-enabled, and/or deployable solution in order to meet Combatant Command and mission partner training requirements as well as Coalition and Service interoperability needs until next generation Joint Training Modeling and Simulation services are fielded with like-capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 761 / *Joint Simulations Systems (JSS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Complete development and delivery of Air Mission Scheduling Service, Tactical Electronic Intelligence Service, and Satellite Service. • Perform test and integration for new development work completed.			
Accomplishments/Planned Programs Subtotals	1.889	2.255	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *JSS O&M Funding*	1.547	0.927	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

RDT&E development efforts are evaluated based on performance metrics. This ensures the development of Joint Force Trainer capabilities synchronizes with warfighter requirements. Performance metrics include, but are not limited to; time, cost, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?
• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

Measures:
• JTLS and JCATS availability in use for support of Service, Combatant Command, agency, and Coalition training activities is above 95%.
• Enhance joint model and simulation capabilities to meet 65% of Combatant Command training requirements in hybrid threats and Anti-Access/Area-Denial functional areas.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	Project (Number/Name) 769 / *Joint Knowledge Development & Distribution Capability (JKDDC)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
769: *Joint Knowledge Development & Distribution Capability (JKDDC)*	12.981	3.811	3.867	3.210	-	3.210	4.482	4.329	4.108	4.108	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Joint Knowledge Development & Distribution Capability (JKDDC) Joint Knowledge Online (JKO) is the DoD unique and authoritative source for online joint training. JKDDC JKO is tasked to develop a Joint Individual Training Toolkit of web-enabled individual and small group training products and services. Products and services are developed in response to OSD(P&R) CE2T2 Program Goals & Objectives guidance, CJCS High Interest Training Issues, Joint Staff J7 training priorities, and JKDDC JKO Stakeholder (Combatant Commands, Services, and Combat Support Agencies) prioritized training requirements. JKDDC JKO supports a career-long joint learning continuum, joint professional military education, and tailored common training standards to Service members for tasks that are jointly executed, resulting in trained, capable, and interoperable joint forces. JKO research and development will improve:

- JKO Learning Content Management System (LCMS): Development and enhancement is required to host and deliver JKO courses and track/report students' completions more effectively and efficiently.
- Small Group Scenario Trainer (SGST) desktop modeling and simulation based training: These capabilities train and prepare tens of thousands of military and civilian personnel deploying to Combatant Command theaters of operation prior to serving in their assigned Combined/Joint Task Force (C/JTF) billets. Specifically, C/JTF 'battle staffs' will be adequately trained, as individuals and the staffs collectively, based on SGST development and implementation throughout the joint training enterprise.
- JKO mobile courseware training device development: Development and enhancements facilitate the global distribution of web-based joint training content on portable, hand-held platforms (cell phones and tablets).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Knowledge Development & Distribution Capability (JKDDC)	3.811	3.867	3.210
Description: JKDDC Joint Knowledge Online (JKO) advanced technology initiatives primarily include the JKO Learning Content Management System (LCMS) application, Small Group Scenario Trainer (SGST) desktop modeling and simulation based training capability, and mobile courseware training devices.. These capabilities facilitate the training and preparation of tens of thousands of military and civilian personnel deploying to Combatant Command (CCMD) theaters of operation prior to serving in their assigned Combined/Joint Task Force (C/JTF) billets. Specifically, JKO LCMS development and enhancements are required to host and deliver JKO courses and track/report students' completions more effectively and efficiently. C/JTF "battle staffs" will be better trained, as individuals and the staffs collectively, based on SGST development and implementation throughout the joint			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 769 / *Joint Knowledge Development & Distribution Capability (JKDDC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

training enterprise. JKO mobile courseware training device development facilitates the global distribution of web-based joint training content on portable, hand-held platforms (cell phones and tablets) for DoD personnel.

FY 2015 Accomplishments:

• Developed, tested and delivered two JKO Learning Content Management System (LCMS) releases resulting in a more effective and efficient online training management application that is interoperable with DoD personnel management systems. Requirements were derived from CCMD user feedback and DoD training priorities directed by DASD(R) for JKO to "develop content for pre-exercise training and support—as required by the Army, Marine Corps and supported GCCs—and support individual and unit training for REF/SP-MAGTF missions." These enhancements have improved the ease of use for the current ~30,000 daily log-ins and ~220,000 monthly course completions by DoD personnel. Improvements to the JKO LCMS have directly benefited thousands of individuals by easing their requirement to complete mandatory joint individual web-based training as a precursor to their participation in numerous CCMD exercise training events.

• Developed, tested, and delivered one JKO Small Group Scenario Trainer (SGST) desktop modeling and simulation application release resulting in a more effective and efficient training capability integrated within the JKO Learning Content Management System (LCMS). Updated product derived from CCMD user feedback providing a more effective and efficient training capability improving the OSD endorsed Blended Learning Training component of CCMD collective training exercises. The SGST was used to prepare individuals serving on CCMD required small functional teams and C/JTF 'battle staffs' in preparation for USTRANSCOM's, USNORTHCOM's, USSOUTHCOM's, USPACOM's and USEUCOM's collective training exercises. Individual training proficiency improvement was measured and quantified as a key component of the exercise design. DoD mandated information assurance network security enhancements were successfully integrated in the release.

• Assessed, refined, and continued executing JKO's comprehensive plan to develop mobile training device capabilities focused on JKO's entire Joint Individual Training Toolkit. Plan components included existing JKO courseware conversion to portable, hand-held devices (cell phones and tablets), emerging FY 2015 training courseware requirements interoperable with portable, hand-held devices (cell phones and tablets), and the leveraging of other DoD agencies, interagency, and multinational training courseware ported to mobile training devices. Developed, converted, tested, and delivered ~120 mobile training courses, eBooks, Podcasts, job aids, and videos. OSD's Transition Veteran's Program Office benefited significantly in assisting military members transitioning to civilian life.

FY 2016 Plans:

• Develop, test and deliver two JKO Learning Content Management System (LCMS) releases resulting in a more effective and efficient online training management application that is interoperable with DoD personnel management systems. Requirements will be derived from CCMD user feedback and DoD training priorities directed by DASD(R) for JKO to "develop content for pre-exercise training and support—as required by the Army, Marine Corps and supported GCCs—and support individual and unit

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
training for REF/SP-MAGTF missions." Anticipate these enhancements will improve the ease of use for the current ~35,000 daily log-ins and ~260,000 monthly course completions by DoD personnel. Improvements to the JKO LCMS will directly benefit thousands of individuals by easing their requirement to complete mandatory joint individual web-based training as a precursor to their participation in numerous CCMD exercise training events. • Develop, test, and deliver one JKO Small Group Scenario Trainer (SGST) desktop modeling and simulation application release resulting in a more effective and efficient training capability integrated within the JKO Learning Content Management System (LCMS). Anticipate these enhancements will improve the quality of the training experience for CCMD exercise participants. The SGST will be used as part of the OSD endorsed Blended Learning Training component in approximately six CCMD collective training exercises to prepare individuals serving on CCMD required small functional teams and C/JTF 'battle staffs'. Individual training proficiency improvement will be measured and quantified as part of the exercise design. • Assess, refine, and continue executing JKO's comprehensive plan to develop mobile training device capabilities focused on JKO's entire Joint Individual Training Toolkit. Planned components include existing JKO courseware conversion to portable, hand-held devices, emerging FY 2016 training courseware requirements interoperable with portable, hand-held devices, and the leveraging of other DoD agencies, interagency, and multinational training courseware ported to mobile training devices. Anticipate the development or conversion of ~150 training courses, eBooks, Podcasts, job aids, and videos resulting in tens of thousands of hours spared for DoD personnel required to take this training. ***FY 2017 Plans:*** • Develop, test and deliver two JKO Learning Content Management System (LCMS) releases resulting in a more effective and efficient online training management application that is interoperable with DoD personnel management systems. Requirements will be derived from CCMD user feedback and DoD training priorities directed by DASD(R) for JKO to "develop content for pre-exercise training and support—as required by the Army, Marine Corps and supported GCCs—and support individual and unit training for REF/SP-MAGTF missions." Anticipate these enhancements will improve the ease of use for the ~40,000 daily log-ins and ~300,000 monthly course completions by DoD personnel. Improvements to the JKO LCMS will directly benefit thousands of individuals by easing their requirement to complete mandatory joint individual web-based training as a precursor to their participation in numerous CCMD exercise training events. • Develop, test, and deliver one JKO Small Group Scenario Trainer (SGST) desktop modeling and simulation application release resulting in a more effective and efficient training capability integrated within JKO Learning Content Management System (LCMS). Anticipate these enhancements will improve the quality of the training experience for CCMD exercise participants. The SGST will be used as part of the OSD endorsed Blended Learning Training component in approximately six CCMD collective training exercises to prepare individuals serving on CCMD required small functional teams and C/JTF 'battle staffs'. Individual training proficiency improvement will be measured and quantified as part of the exercise design.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 769 / *Joint Knowledge Development & Distribution Capability (JKDDC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Assess, refine, and continue executing JKO's comprehensive plan to develop mobile training device capabilities focused on JKO's entire Joint Individual Training Toolkit. Planned components include existing JKO courseware conversion to portable, hand-held devices, emerging FY 2017 training courseware requirements interoperable with portable, hand-held devices, and the leveraging of other DoD agencies, interagency, and multinational training courseware ported to mobile training devices. Anticipate the development/conversion of ~150 training courses, eBooks, Podcasts, job aids, and videos resulting in tens of thousands of hours spared for DoD personnel required to take this training.			
Accomplishments/Planned Programs Subtotals	3.811	3.867	3.210

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *JKDDC O&M Funding*	6.031	6.038	5.394	-	5.394	5.490	5.218	5.287	5.287	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Joint Staff prescribed performance metrics include, but are not limited to; time, cost, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?
• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

Measures:
• Augment the ability to provide cultural context training for Combatant Command Joint Mission Essential Task functional areas by one geographic area of responsibility, and two mission areas per year.
• Provide small group training focused on Joint Exercise Life Cycle specified mission areas for pre-requisite in exercise augmentation, or post exercise remediation training for three exercise response cells per year.
• Add techniques to modify JKO software to automate certain courses to become more adaptive to the learner.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 769 / *Joint Knowledge Development & Distribution Capability (JKDDC)*

• Provide a systematic, steady-state process for integrating cultural context, small group training, and intelligent remediation requirements into the Joint Training System Phase I of the initiative, resulting in improved training and readiness for the warfighter.
• Provide cost model for evaluating level of effort, additional conditions and standards for cultural context, small group training, and intelligent remediation to Joint Mission Essential Task training solutions for the Joint Training System Phase II, resulting in improved readiness, while providing improved training to the warfighter, will be in place by year five of the initiative.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 770 / *U.S. Forces Korea Training and Exercise Support*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
770: *U.S. Forces Korea Training and Exercise Support*	30.047	3.861	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	33.908
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The U.S. Forces Korea (USFK) Training & Exercise Support program develops simulations capable of satisfying all joint exercise training requirements in the Korean Theater of Operations. Interoperability with the Republic of Korea-developed Korean Simulation System (KSIMS) is a critical and unique requirement of this USFK RDT&E program. This solution will be capable of interoperating in a common battle space that realistically represents the operating environment to all levels of training audiences -- tactical to strategic -- in Korean theater exercises. While supporting USFK's specific requirements, this solution will contain enhancements that will benefit other combatant commander training programs that use the aging Joint, Live, Virtual, and Constructive (JLVC) simulations and the emerging JTSE (previously JLVC 2020) simulations. FY 2015 is the last year for dedicated funding within the overall program.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: USFK Training & Exercise	3.861	-	-
Description: This program provides Joint Training Environment support to the 2015 stand-up of KORCOM as a sub-unified command under USPACOM. This program develops a jointly accredited, supported, and funded federation of constructive models and simulations which are capable of satisfying all joint exercise training requirements in the Korean Theater of Operations (and which is interoperable with KSIMS). While supporting U.S. Forces Korea specific training requirements, this solution is inextricably linked to the JTSE modeling and simulation capability via Cloud-Enabled Modular Services. This will provide a common, interoperable simulated battlespace which realistically represents the operating environment to all levels of training audiences (tactical to strategic) in Korean theater exercises and across the Combatant Commands, Services, and coalition Partners.			
FY 2015 Accomplishments: • Continued to enhance Army, Air Force, Navy, and Marine Corps Live, Virtual, and Constructive capabilities and fully integrate these into the JTSE modeling and simulation capability to meet USFK theater specific, Combatant Command, Service, and Coalition training requirements. • Invested in technology necessary to address Korean/U.S. modeling and simulation interoperability challenges and joint training requirements on Peninsula. Efforts supported Joint/Service modeling and simulation with ROK modeling and simulation capable			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 770 / *U.S. Forces Korea Training and Exercise Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
of supporting large (e.g. > 1 million entities), high-intensity combat scenarios under a single integrating architecture for Joint Training.			
Accomplishments/Planned Programs Subtotals	3.861	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *U.S. Forces Korea Training & Exercise Proc*	0.299	0.000	0.000	-	0.000	0.000	0.000	-	-	0.000	0.299

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

RDT&E development efforts are evaluated based on performance metrics. This ensures the development of Joint Force Trainer capabilities synchronizes with warfighter requirements. Performance metrics include, but are not limited to; time, cost, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?
• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

Measures:
• Develop software for interoperability of JLVC versions along with initial integration of the Army's Multi-Resolution Federation (MRF). Additionally, provide a validated approach for Cross Domain Information Sharing technologies and Korea Battle Simulation Center (KBSC) simulations to the joint training enterprise that meets USFK technical training requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	Project (Number/Name) 701 / *Air Force Joint National Training Capability (JNTC)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
701: *Air Force Joint National Training Capability (JNTC)*	7.185	2.339	2.701	2.242	-	2.242	3.130	3.024	2.869	2.869	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air Force JNTC funding provides a focused upgrade to develop models for space-based and cyber capabilities for integration into the Joint Live, Virtual, Constructive (JLVC) environment. The Air Force supports development of cross-domain solutions that enable the integration of systems with disparate security requirements, and significantly increases the training audience to additional joint and coalition participants. The Air Force supports the development of simulation integration making Air and Space capabilities available to the Joint community.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Air Force Joint National Training Capability (JNTC)	2.339	2.701	2.242

Description: The Air Force continues to develop joint enablers that drive realistic/effective training by producing a deployable Electronic Warfare training capability for Europe which replicates highly advanced Surface-to-Air Missiles and advance Anti-Aircraft Artillery threats for U.S. and coalition forces. Additionally, the Air Force assists in the engineering, development, and deployment of Joint Cross Domain Information Sharing (JCDIS) Enterprise Network Architecture which will enable joint and coalition participants to train while protecting classified information. Furthermore, the Air Force is creating cyber-contested environments in the distributed mission operations setting to challenge the joint exercise/training audience. Finally, comprehensive space effects are being integrated into the Joint Live, Virtual, and Constructive (JLVC) federation of models.

FY 2015 Accomplishments:

- Cyber Simulation: Continued improving a LVC Cyber Simulator to train tactical cyber operators in offensive and defensive operations. Continued modeling cyber effects on adversary networks for presenting the cyber effects for conventional forces through the ACE-IOS.
- Joint CDIS Enterprise Network Architecture: Continued to develop and engineer a persistent enterprise level CDIS network architecture to achieve maximum NATO, coalition, and agency participation in joint and service training events.
- ACE-IOS: Migrated the ACE-IOS to meet the new standards being developed for JLVC 2020. Improved the efficiency of the ACE-IOS through performance enhancing techniques and improved data generation capabilities.
- Simulation Integration: Integrated the mission training simulators for the Predator/Reaper Unmanned Aerial System platforms into the Distributed Mission Operation federation of simulators.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 701 / *Air Force Joint National Training Capability (JNTC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Space Simulations: Improved Space simulation capabilities in the GPS and infrared sensor representations in the ACE-IOS. Enhanced the capability to incorporate top secret data into the simulation capabilities. • Exercise Debrief Capabilities: Ported the Live Venue Common Operation Picture to support exercise Angel Thunder. ***FY 2016 Plans:*** • Space and Cyber Simulation: Continue to develop the cyber capabilities and migrate these capabilities to the JLVC 2020 standards. • Joint CDIS Enterprise Network Architecture: Continue to develop and engineer a persistent enterprise level CDIS network. • ACE-IOS: Continue to improve the efficiency of the ACE-IOS through training solutions supporting Collaborative Planning, Cost, AAR and Metrics/ROI for Joint Training. • Simulation Integration: Improve the VIRTUAL FLAG Intelligence, Surveillance, and Reconnaissance/Battle Damage Assessment. • Space Simulations: Continue to improve Space simulation capabilities in the GPS and infrared sensor representations in the ACE-IOS. Continue to enhance the capability to incorporate top secret data into the simulation capabilities. Enhance the Command and Control capability of the space simulations. • Exercise Debrief Capabilities: Continue porting the Live Venue Common Operation Picture to support live exercises. ***FY 2017 Plans:*** • Cyber Simulation: Continue improving a LVC Cyber Simulator. • Joint CDIS Enterprise Network Architecture: Continue to develop and engineer a persistent enterprise level CDIS network. • ACE-IOS: Migrate the ACE-IOS to meet the new standards being developed for JLVC 2020. • Space Simulations: Improve Space simulation capabilities in the GPS and infrared sensor representations in the ACE-IOS.			
Accomplishments/Planned Programs Subtotals	2.339	2.701	2.242

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *Air Force JNTC O&M Funding*	12.043	10.514	9.636	-	9.636	9.729	9.673	9.821	9.821	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 701 / *Air Force Joint National Training Capability (JNTC)*

E. Performance Metrics

RDT&E development efforts are evaluated based on performance metrics. This ensures the development of Joint Force Trainer capabilities synchronize with warfighter requirements. Performance metrics include, but are not limited to; time, cost, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?
• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

Measures:
• Cyber: Establish a persistent simulation environment that can be configured rapidly and accurately to reflect the desired operating environment of the training audience. Also, create an ability to reflect cyber activities against a live Integrated Air Defense system.
• Joint CDIS Enterprise Network Architecture: develop Joint Cross Domain Information Sharing (JCDIS) Enterprise Network Architecture which provides a persistent, enterprise-level, government off-the-shelf (GOTS) CDIS architecture to achieve maximum joint/coalition and agency participation in joint training events. This effort will provide a native live, virtual, constructive, protocol-based, lower-cost, higher performance, and non-proprietary capability currently lacking in the JLVC training environment.
• ACE-IOS: The Air Force's Air, Space, and Cyber Constructive Environment (ASCCE) suite of LVC models are modified to fully integrate with Joint Staff - J7's JLVC 2020 LVC models.
• Space: a fully operational GPS environment which allows space operators to actively participate in Distributed Mission Operations-Space LVC missile warning, GPS disruption and Infrared special events.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	Project (Number/Name) 772 / *Navy Joint National Training Capability (JNTC)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
772: *Navy Joint National Training Capability (JNTC)*	11.611	2.248	2.825	2.345	-	2.345	3.318	3.205	3.042	3.042	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

These funds enable the Navy to develop unique maritime capabilities that integrate Joint Live, Virtual, and Constructive (JLVC) elements into a seamless joint training environment. The Navy program activities include conducting research, development, test and evaluation, and cross-service architecture certification on joint-capable systems. Additionally, the program develops cross-domain architectures for U.S. and Coalition Forces and ensures sister service modeling/simulation and instrumentation efforts follow a unified standard.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Navy Joint National Training Capability (JNTC)	2.248	2.825	2.345
Description: Develops unique maritime capabilities that integrate Joint Live, Virtual, and Constructive (JLVC) elements into a seamless joint training environment. Using a scientific and phased approach that focuses on modeling ground, air, space, and maritime capabilities, this program researches new technology and methods that provide a crucial technology-based foundation that supports all JNTC Training Transformation (T2), JLVC Federation, and Combatant Commanders Exercise and Engagement (CE2) operations.			
FY 2015 Accomplishments: • Ensured alignment of Navy LVC training standards with JLVC training standards. • Sustained with minor enhancements the ballistic missile defense models in support of Aegis Ashore Team Trainer (AATT) and EUCOM/CENTCOM exercise requirements. • Sustained with minor enhancements maritime models in support of Coalition Partner nation capabilities.			
FY 2016 Plans: • Continue alignment of Navy LVC training standards with JLVC training standards. • Conduct research and development of integrated capabilities between Navy tactical training ranges and synthetic training capabilities in support of Navy LVC efforts. • Conduct limited research and development of combat identification training simulation as an enabler for spectrum operations in support of the information warfare commander (IWC). • Minimal exploration of technologies to enable Integrated Air and Missile Defense (IAMD) and other combined warfare area and joint training with coalition partners in the Pacific Fleet (PACFLT) Area of			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 772 / *Navy Joint National Training Capability (JNTC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Responsibility including Japan, Korea and Australia. • Continue collaborative development with Service and Agency partners to improve the realism and relevancy of tactical to operational level of war training capabilities. ***FY 2017 Plans:*** • Continue alignment of Navy LVC training standards with JLVC training standards to include with research of integrated standards with USMC's Aviation Distributed Virtual Training Environment (ADVTE). • Prototype and develop of integrated capabilities between Navy tactical training ranges and synthetic training capabilities in support of Navy LVC efforts. • Accelerate research and development of combat identification training simulation as an enabler for spectrum operations in support of the information warfare commander (IWC). • Accelerate exploration of technologies to enable Integrated Air and Missile Defense (IAMD) and other combined warfare area and joint training with coalition partners in the Pacific Fleet (PACFLT) Area of Responsibility including Japan, Korea and Australia. • Continue collaborative development with Service and Agency partners to improve the realism and relevancy of tactical to operational level of war training capabilities.			
Accomplishments/Planned Programs Subtotals	2.248	2.825	2.345

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0804767D8Z: *Navy JNTC O&M Funding*	6.992	7.877	7.770	-	7.770	7.818	7.784	7.898	7.898	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

RDT&E development efforts are evaluated based on performance metrics. This ensures the Joint Force Trainer capabilities development effort synchronizes with warfighter requirements. Performance metrics include, but are not limited to; time, money, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 772 / *Navy Joint National Training Capability (JNTC)*

• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

• The Navy will produce one Navy Training Baseline (NTB) software release to include documentation; will design and implement upgrades to Joint Semi-Automated Forces (JSAF) consistent with approved requirements and CRs and document the effects of JSAF capabilities (robustness) and stability. Will design, implement, test, and integrate NTB enhancements in accordance with requirements.

• For JSAF, Joint Simulation BUS (JBUS) reliability, scalability, and tactical control, the Navy will continuously update the Common Operational Picture (COP) during large scale JLVC exercises.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	Project (Number/Name) 702 / *JCATS/JTLS*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
702: *JCATS/JTLS*	-	0.000	0.000	0.976	-	0.976	1.106	1.068	1.000	1.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

JTLS/JCATS provides warfighters with joint simulations and analysis capabilities that enhance and enable Joint training across Services and CCMDs while maintaining partnership, collaboration and interoperability with our allies, coalition partners, federal agencies, and nongovernmental organizations (NGO). The overarching objective is to maximize users' return on investment by providing a flexible, scalable, deployable or distributed low-cost training solution. JTLS and JCATS are critical enablers that support the delivery of trained, capable, and interoperable Joint Forces.

JCATS is a multi-sided, interactive high resolution, entity level, modeling and simulation tool:
• Supports 10 JS J7 exercises annually, integrating 3 NATO sites, and 30 partner nations
• JCATS is used at over 300 U.S. facilities and used for more than 2,000 DoD and DoE events per year
• Provides modeling and simulation capabilities essential for NATO and the 30 foreign countries
JTLS is an interactive, multi-sided simulation with semi-automated forces used to support Joint Force, multi-level, multi-echelon training. JTLS is theater and doctrine independent and models Joint air, land, naval, and special operations forces. It contains a fully integrated Logistics and Intelligence modeling and reporting capability.
• Sustains and improves the Joint Staff, J7 Joint Training Toolkit used for supported CCMD exercises: 5 to 7 JS J7 exercises annually; 4 to 6 annual USPACOM Theater Security Cooperation events; interoperability training for NATO and 20 partner nations
• Provides a low cost, distributed or deployable, web-based joint operational training M&S capability with a small technical and operator footprint
• Provides M&S capabilities essential to NATO and Partnership-for-Peace program

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Joint Theater Level Simulation / Joint Conflict and Tactical Simulation (JTLS/JCATS)	-	-	0.976
Description: JTLS/JCATS provides warfighters with joint simulations and analytical training solutions that enhance and enable Joint training across Services, CCMDs, Agencies, NATO and Coalition partners. The JTLS and JCATS are critical enablers that support the delivery of trained, capable, and interoperable Joint Forces.			
FY 2017 Plans: • Conduct research, development, testing and evaluation to ensure relevancy through the development of current foundational joint training capabilities vested in JCATS and JTLS and ensure DoD organizations and multi-national partners can train effectively with JTLS and JCATS.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0804767D8Z / *COCOM Exercise Engagement and Training Transformation (CE2T2)*	**Project (Number/Name)** 702 / *JCATS/JTLS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Continue JTLS and JCATS development to maximize the use of innovative, low-cost approaches to address exercise and engagement requirements. • Conduct research, development, testing, and evaluation to ensure cyber security, shifting training priorities, address current and emerging training gaps, and C4I integration requirements are met.			
Accomplishments/Planned Programs Subtotals	-	-	0.976

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

RDT&E development efforts are evaluated based on performance metrics. This ensures the Joint Force Trainer capabilities development effort synchronizes with warfighter requirements. Performance metrics include, but are not limited to; time, money, realism, and fidelity as defined below:

• Time – Will the effort enable the Joint Force Trainer to prepare and execute training more timely than current capabilities allow?
• Cost – Will the effort enable the Joint Force Trainer to prepare and execute training at a more effective and efficient cost than current capabilities allow?
• Realism – Will the effort enable the Joint Force Trainer to create a training environment that is closer to the real world environment than current capabilities allow?
• Fidelity – Will the effort enable the Joint Force Trainer to create more detailed capabilities in the training environment than current capabilities allow?

Measures
• JTLS and JCATS availability in use for support of Service, CCMD, agency, and Coalition training activities is above 95 percent.
• Enhance joint model and simulation capabilities to meet 65 percent of CCMD training requirements in hybrid threats and Anti-Access/Area-Denial functional areas.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0909999D8Z / *Financing for Cancelled Account Adjustments*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	3.404	0.995	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
546: *Financing for Cancelled Account Adjustments*	3.404	0.995	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RDT&E Management Support. Financing for cancelled accounts adjustments.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.995	0.000	0.000	-	0.000
Total Adjustments	0.995	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.995	-			
• SBIR/STTR Transfer	-	-			

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Not applicable for this item.	0.995	-	-
FY 2015 Accomplishments: Not applicable for this item.			
Accomplishments/Planned Programs Subtotals	0.995	-	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0909999D8Z *I Financing for Cancelled Account Adjustments*

F. Performance Metrics

Not applicable for this item.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	9.638	14.282	22.532	16.195	-	16.195	11.029	5.619	5.697	5.808	Continuing	Continuing
819: *Industrial Base Analysis and Sustainment*	9.638	14.282	22.532	16.195	-	16.195	11.029	5.619	5.697	5.808	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense-wide Industrial Base Analysis and Sustainment (IBAS) program element, directed by Title 10 USC Section 2508, provides the Department with a comprehensive ability to monitor and assess the industrial base, to address critical issues relating to urgent operational needs and industrial base vulnerabilities and to support industrial base expansion. This program maintains or improves the health of critical and fragile industry capabilities that are at risk of being lost but are needed either at present, or have verified future requirements, to support the National Defense Strategy. The goal of the program is to avoid loss of critical capabilities and resultant reconstitution costs wherever affordable and innovative mechanisms are available to the producers in the interim.

IBAS will 1) provide lifelines and safe harbors for unique critical capabilities with fragile business cases, 2) preserve design teams with the critical skills necessary for technological superiority, and 3) support expansion and competition of reliable sources.

Criteria for project selection will include factors such as 1) identifiable path of preservation, transformation or innovation between an existing capability and a capability with a very high probability of being needed in the short to medium term 2) loss of the capability is likely in the absence of the proposed project; 3) analysis showing that the project results in a lower overall cost to the department than if capability is developed from scratch when needed; and 4) preference is given to projects supporting multiple programs or services with multiple beneficiaries.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	14.756	22.576	16.705	-	16.705
Current President's Budget	14.282	22.532	16.195	-	16.195
Total Adjustments	-0.474	-0.044	-0.510	-	-0.510
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.006	-			
• SBIR/STTR Transfer	-0.468	-			
• Reduction for rebalancing of Department priorites	-	-	-0.510	-	-0.510
• Reduction for FY16 Prior Year Execution	-	-0.044	-	-	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607210D8Z *I Industrial Base Analysis and Sustainment Support*

Change Summary Explanation

The $6 million decrease from FY2016 to FY2017 reflects a special emphasis one-time increase in FY 2016 for Space Sector Sustainment. The funding was targeted to maintain active Mercury-Cadmium-Telluride (MCT) detector production (and the capability to surge) and qualify domestic carbon fiber for structures to meet the needs of National Security Systems in the Missile and Space Sectors.

FY 2017 baseline program decreased by a net amount of $.056 mil for rebalancing of Department priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	Project (Number/Name) 819 / *Industrial Base Analysis and Sustainment*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
819: *Industrial Base Analysis and Sustainment*	9.638	14.282	22.532	16.195	-	16.195	11.029	5.619	5.697	5.808	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The IBAS program has a two-pronged approach to identify projects: 1) periodic assessments of the national technology and industrial base by the OSD Acquisition, Technology and Logistics (AT&L) office of Manufacturing and Industrial Base Policy (MIBP) as directed by 10 U.S. Code 2505, and 2) a call for projects to industry. MIBP collaborates with the services and agencies in performing assessments under the 2505 program to identify elements of the industrial base where current spending on production and research is insufficient to keep critical capabilities viable. While industrial base risks are mitigated primarily through the direct engagement of prime contractors, program managers and military departments, exceptional cases require a more direct defense-wide intervention strategy. This Defense-wide Industrial Base Analysis and Sustainment (IBAS) program element, directed by Title 10 USC Section 2508, provides the Department with that means.

All projects are evaluated for industrial base risk using fragility and criticality risk criteria, similar to the more familiar probability and consequence risk criteria. Fragility examines characteristics that make a specific capability likely to be disrupted. Criticality examines characteristics that make a specific capability difficult to replace if disrupted. In addition to the gating criteria of fragility and criticality, additional factors for project selection include:

- An identifiable path of preservation or innovation for an existing capability with a very high probability of being needed in the short to medium term
- The loss of the capability is likely in the absence of the proposed support
- An analysis showing that the project results in a lower overall cost to the department than if capability is developed from scratch when needed

IBAS investments are focused on three broad industry groupings: 1) Missiles and Munitions, 2) Space, and 3) Other industrial base niches. Priority is given to investments that cut across multiple platforms and services.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Missile and Munitions Industrial Base Sustainment	6.500	11.296	11.790
Description: With a multi-decade decline in missile program development and procurement, design and production capabilities for critical components within the missile sector industrial base are at risk. This has a significant impact on current and future missile programs, limiting the readiness and availability of superior technology to U.S. Warfighters. The missile sector sustainment will exercise the design and production skills of this critical industrial base by improving existing production processes, exploring advanced materials for higher performance, and upgrading outdated technology for missile components. A missile sector Fragility and Criticality assessment has highlighted the need for specific action to preserve industrial base capabilities for fuzes and thermal batteries.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

FY 2015 Accomplishments:

Advanced Solid Rocket Propulsion: Completed work on a project that supports future missile interceptor missions with advanced kill vehicle thrusters for high precision and long duration missions. This is a defense-unique industrial base niche. The project developed a new Solid Divert and Attitude Control Systems (SDACS) diverter valve with advanced structural insulators and high-temperature seals. The primary purpose was preservation of design team capabilities for Solid Divert and Attitude Control Systems (SDACS). Funding research to sustain DACS competition is a specifically stated Congressional concern.

Butanetriol (BT): Completed work to develop a qualified domestic source for BT, a solid rocket propellant precursor chemical, precluding the necessity of procurement from a prohibited foreign source. Since 2008, DoD's projected requirements have shrunk to levels that made it uneconomical for domestic suppliers to develop BT production capability. IBAS funded a cost-sharing project with the new supplier to retrofit an existing Dihydrofuran reactor, modify pumping, plumbing, heat management and process controls to an existing reactor, relocate existing atmospheric storage tank for waste collection and modify the discharge filtering system of an existing reactor.

Electronic Safe and Arm Device (ESAD): Because of the decline in missile production, fuzes are experiencing a decline in production, making the industrial base very fragile. Without intervention, loss of industry design and production expertise is expected for ESAD-based fuzes. ESADs are most commonly used in missile fuzing, but have applicability to some of the Department's most critical gun fired and air delivered munitions as well. To improve the industrial base capability, IBAS is funding EASD design projects for cost reduction and commonality across multiple missile and munition end-products. Phase I was initiated by contracting with three different suppliers to exercise their engineering capability, including the use of sub-tier suppliers and component technology, to develop lower cost, common architecture ESAD designs. These three suppliers form the critical core of the US Industrial Base for fuzes overall. Phase II is planned for award in FY 2017. In this phase the work from Phase I will then be applied against a post milestone C munition which can benefit the most from an upgraded fuze capability.

Low Energy Exploding Foil Initiators (LEEFI): This fuze project was initiated to develop a backup manufacturing capability for LEEFIs. LEEFIs are a critical subcomponent used in all Electronic Safe and Arm Devices ESADs. The current production facility is the sole source for LEEFI fuzes used in a wide variety of DoD missile programs. The ability to manufacture these specialized initiators at an alternate location eliminates the risk of a single point of failure that has the potential to hobble production on all missile programs simultaneously.

Thermal Batteries: Similar to the issue with fuzes, the decline in missile production has made the industrial base for thermal batteries very fragile. Production is falling below minimum sustaining rates. IBAS has initiated three projects for thermal battery technical improvements in battery materials and shelf life that will lower minimum sustaining rates: improved material composition

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017

that will provide additional domestic suppliers, characterization of Thermal Battery shelf-life model to enhance production quality and sustainment (reducing costs and industrial base burden), and improved thin film production to broaden and improve the market.

FY 2016 Plans:

Electronic Safe and Arm Device (ESAD): Phase I engineering projects which will continue to develop lower cost, common architecture ESAD designs.

Low Energy Exploding Foil Initiators (LEEFI): Work will be completed on the backup manufacturing capability for LEEFI fuzes eliminating the potential single point of failure affecting all missile programs.

Thermal Batteries: Work will continue on the three projects for thermal battery technical improvements.

Solid Rocket Motors: For the purpose of sustaining at-risk critical design skills, DoD will conduct advanced propulsion system technology development, maturation and demonstration that advance the state-of-the-art in propulsion component, sub-system and system solutions that enable enhanced multi-mission capabilities. The focus will be: (1) improving and maintaining design engineering capability and knowledge base in the areas of advanced propellant formulations, case/nozzle/insulation approaches, ignition systems, energy management approaches, and safety enhancements; (2) implementation of propulsion solutions that advance state-of-the-art in mission flexibility, agility, volumetric/mass efficiency, and affordability; and (3) demonstration of a down-selected integrated flight-type propulsion solution that effectively demonstrates that the critical technological elements can function together in a relevant environment.

FY 2017 Plans:

Electronic Safe and Arm Device (ESAD): Phase II will be initiated which takes the engineering projects of phase I and performs the system integration work to retrofit the new ESADs to existing post milestone C munition which can benefit the most from an upgraded fuze capability. This will further exercise the critical fuze industrial base along with the subtier suppliers as pre-qualification prototype quantities will be manufactured after the design from phase I is further refined for the selected application. The end production will not only be to have successfully supported this critical industrial base, but to also pave the way for the warfighter to receive a higher quality upgraded capability from a munition system. Application of ESAD designs as common architecture to multiple missiles and munitions during this phase enables realization of the desired cost savings.

Thermal Batteries: The thermal battery industrial sector initiative will continue with call for proposals for FY 2017 and 2017. The primary focus for FY 2017-2018 time period will be on improvements within product characteristics and production methods, and development of new technologies which enable the sustainment of the industrial base while meeting Department of Defense requirements. The thermal battery industrial sector will continue to be assessed to ensure existing and emerging requirements are developed to support National Security Directives.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Solid Rocket Motors: Work will continue on the solid rocket motor project initiated in 2016.			
Title: Space Industrial Base Sustainment	3.638	7.000	-
Description: Investment in key sub-tier suppliers will ensure qualified suppliers exist to support future system development efforts. ***FY 2015 Accomplishments:*** Radiation Hardened Products: A number of unique radiation hardened products from a sole source supplier highly likely to be used by a number of future programs have completed development but require final space qualification. The supplier cannot fund this at their own expense. Without funding to perform space qualification work, the products will not be ready for use when needed and the supplier is highly likely to leave the business. Work was initiated to perform final space qualification work and avoid the much higher cost of developing replacement products with an alternative supplier. National Security Space Programs: Mercury Cadmium Telluride (MCT) infrared sensors permit highest performance and highest technical and manufacturing readiness levels for tactical/strategic/space applications. Volumes for MCT wafer fab production in 2014 plummeted 60% below historical annual average for the past seven years. Forecast volumes to fall another 50% next year, far below the minimum number per year to maintain this critical technology. IBAS initiated work to identify cost drivers and develop improvements in space-based sensors. This builds upon Defense Wide Manufacturing Science and Technology (ManTech) work on material for MCT infrared focal plane arrays. ***FY 2016 Plans:*** Radiation Hardened Products: Work will be completed on the project for final space qualification work and avoid the much higher cost of developing replacement products with an alternative supplier. The critical devices and technologies to be qualified: * Planar Diodes * Photodiodes * Phototransistors * Rad Hard By Design Bipolar Junction Transistors * Optocoupler devices * Surface Mount package diodes in UM packages * Insulated Gate Bipolar Transistors (IGBT) * Rad Hard MOSFET Devices			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
National Security Space Programs: Work will be completed on identifying cost drivers and develop improvements in space-based sensors that builds upon ManTech work on material for MCT infrared focal plane arrays. A new project will be initiated to preserve capability by manufacturing additional wafers targeting the performance requirements for space infrared sensors. High Performance Carbon Fiber: A number of specialized (high-strength and high modulus) carbon fibers are critical to manufacturing composite structures for all types of major U.S. space military and civilian programs (e.g., satellites, space launch vehicles, spacecraft and a wide ride range of missile systems). Key carbon fibers for these applications are unique, essential (not readily substitutable) and proprietary to a single producer/single factory in one foreign country (Japan). This foreign, single point-of-failure source of supply, of materials critical to essentially all major high priority space programs, is vulnerable to many severe and long-lasting supply disruption risks (e.g., natural disaster, industrial accidents, future Asia conflicts, foreign government controls and higher foreign commercial market priorities. Regarding the latter, U.S. program carbon fiber use typically represents a small fraction of total global demand. Carbon fibers recently developed in the U.S. and commercialized for civilian applications are promising alternatives to imports. They represent a competitive second source, a more assured supply, cost less, and reportedly perform equal to or better than imports. Historically, U.S. government programs have relied on single foreign sourced legacy materials and funding is often not available in government programs to test and qualify alternative second sources. FY 2016 IBAS funds will be used to test and qualify U.S. second sources of commercially available carbon fibers. With strong cooperation from industry primes, lower tier and material suppliers -- a significant list of promising U.S. government qualification program opportunities are identified for FY 2016 execution (e.g., multiple satellites, missiles and “other” systems). Planned IBAS projects represent low technology risks, have well defined and near-term program transition points and are low-cost relative to significant industry investments in new, domestically manufactured carbon fiber supplies.			
Title: Other Unique Industry Capabilities	4.144	4.236	4.405
Description: With an overall decline in defense budgets, the industrial base sectors and niches hit hardest are those with a combination of unique requirements and low, limited or declining production. ***FY 2015 Accomplishments:*** CounterBomber: A program to sustain a suicide bomber detection capability provided by the CounterBomber system was initiated. This IBAS implementation addressed the risk of the manufacturer leaving the market because of falling sales associated with decreased U.S. troop deployment. IBAS bridged the gap between rapid prototype and formal DoD production while facilitating additional improvements including lowering the system size, weight, power consumption and cost. Electromechanical Actuators: This project was initiated to preserve unique capabilities in the manufacture of precision Electromechanical Actuators and to establish a domestic ability to machine planetary roller screws, a component critical to the actuators’ performance. These actuators are needed to meet performance requirements for weapons and stores elevator systems			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
aboard the Gerald R. Ford Class of aircraft carriers. This unique manufacturing capability was at risk due to the interval between the first and second ships' material procurements. ***FY 2016 Plans:*** CounterBomber: The program to a sustain suicide bomber detection capability provided by the CounterBomber system will continue. During the first half of FY 2016, the Size, Weight and Power (SWAP) reduction effort will completed, as well as enhancements to the core CounterBomber technology which includes limited crowd scanning capabilities providing the US Government with a smaller, lighter, more resource efficient system at a lower acquisition cost, and having significant performance improvements that greatly expand the opportunities for employing this technology both domestically and abroad; implementation of AT hardware and software guards will ensure that the system can be continue utilized as a Force Protection asset to forward deployed US Armed Forces. Electromechanical Actuators: The project to preserve Electromechanical Actuator manufacturing capability for aircraft carrier weapons and stores elevator systems will continue through FY 2016. ***FY 2017 Plans:*** Critical Energetic Materials: Critical Energetic Materials: For the purpose of maintaining an adequate North American industrial base for critical key energetic materials and their pre-cursors, DOD will develop prototype manufacturing processes for many key energetic materials and their pre-cursors. Project phasing is expected to be: Phase 1 – Analysis of current technology/capability, Phase 2 – Develop a plan for a prototype manufacturing process, Phase 3 – Build the prototype manufacturing process, and Phase 4 – Provide samples of the materials with that manufacturing process. DoD will conduct additional industrial base assessments in FY 2016 to identify weaknesses and fragile and critical capabilities for FY 2017 project development. A Joint Industrial Base Working Group (JIBWG) Panel will rank the proposals, and the Deputy Assistant Secretary of Defense (DASD) for Manufacturing and Industrial Base Policy (MIBP) will make the final selection.			
Accomplishments/Planned Programs Subtotals	14.282	22.532	16.195

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

E. Performance Metrics

Goal - Insert industrial base considerations consistently in program review:
To make informed investment and production decisions
To avoid reconstitution costs for capabilities that DoD will need again.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	Project (Number/Name) 819 / *Industrial Base Analysis and Sustainment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile and Munitions Industrial Base Projects	Various	various : various	5.000	6.500		10.981		11.624		-		11.624	-	-	-
Space Sector Projects	Various	various : various	1.789	3.932		7.000		-		-		-	-	-	-
Other Defense Industrial Base Capability Projects	Various	various : various	2.500	3.526		4.222		4.237		-		4.237	-	-	-
		Subtotal	9.289	13.958		22.203		15.861		-		15.861	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Industrial Base Analysis Sustainment (IBAS) Program Management Services	MIPR	RDECOM, RDCB-DE : Rock Island, IL	0.349	0.324		0.329		0.334		-		0.334	-	-	-
		Subtotal	0.349	0.324		0.329		0.334		-		0.334	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9.638	14.282		22.532		16.195		-		16.195	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	Project (Number/Name) 819 / *Industrial Base Analysis and Sustainment*	

IBAS Project Plan

FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Solid Rocket Propulsion							
Butanetriol							
Infrared sensors							
	LEEFI						
	CounterBomber						
	Electronmechanical Actuators						
	Infrared sensors						
	Radiation Hardened Products						
	ESAD Fuzes						
	Thermal Batteries						
		Carbon Fiber					
		Mercury Cadmium Telluride					
			New Competed Project				

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607210D8Z / *Industrial Base Analysis and Sustainment Support*	**Project (Number/Name)** 819 / *Industrial Base Analysis and Sustainment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
N/A				
Infrared Sensors	3	2014	4	2015
LEEFI	1	2015	4	2016
CounterBomber	1	2015	4	2016
Electromechanical Actuators	1	2015	4	2016
Infrared Sensors II	1	2015	4	2016
Radiation Hardened Electronic Components	1	2015	4	2016
ESAD Fuzes	1	2015	4	2019
Thermal Battery	1	2015	4	2019
High Strength High Modulus Carbon Fiber	1	2016	4	2017
Mercury Cadmium Telluride	1	2016	4	2017
Solid Rocket Motors				
Solid Rocket Motors	2	2016	4	2021
Critrical Energetic Materials				
Critiical Energetic Materials	1	2017	4	2018

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	1.872	2.849	1.898	4.194	-	4.194	7.572	7.443	6.917	7.052	Continuing	Continuing
P242: *Operational System Development*	1.872	2.849	1.898	4.194	-	4.194	7.572	7.443	6.917	7.052	Continuing	Continuing

Note

The FY 2017 funding request was reduced by $1.551 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

The Countering Weapons of Mass Destruction (CWMD) Systems program is researching, developing, integrating, testing, and deploying a CWMD situational awareness system. This system will enable a comprehensive, global capability for situational awareness of threats from Weapons of Mass Destruction (WMD) as well as global efforts to counter those threats. This system will enable a shared understanding of the CWMD operating environment and will support planning and decision-making by the U.S. government and its partners. The CWMD mission space is characterized by immense amounts of information, such as the characteristics and location of WMD related facilities and materials, personnel and expertise, and dual-use technologies. The CWMD Systems program comprises next-generation advanced information technologies, coupled with affiliated fusion cells, to locate, gather, access, share, and visualize this WMD-relevant information to facilitate collaboration and decision-making. These solutions will revolutionize CWMD knowledge management, providing decision makers and operational personnel a dynamic, tailorable, and holistic view of the global CWMD operating environment.

The diversity and complexity of the CWMD mission requires an integrated approach toward capability development, based on a systems perspective that links strategic objectives with interrelated tasks and associated capabilities. The CWMD mission is intertwined with counter-terrorism and homeland defense and hence system development must leverage and integrate complementary technologies developed to support other mission areas. The CWMD Systems program also will enable international collaboration in countering WMD by breaking down unnecessary data stove-pipes and by enabling the U.S. Government and its partners to access and share knowledge.

This program also responds to the strategic needs outlined in the 2014 Quadrennial Defense Review (QDR), the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance (DPG), and capability requirements approved by the Joint Requirements Oversight Council (JROC). The CWMD Systems program will develop and field a global CWMD situational awareness capability to meet the needs of Combatant Commands, the Office of the Secretary of Defense (OSD), the Joint Staff, the Services, and Defense Agencies. Other U.S. Government Departments and Agencies will be able to utilize this capability to support their mission needs and collaborate with the Department of Defense. This program is designed to leverage existing DoD resources and proven approaches to achieve its goals and rapidly deliver an operational capability.

The CWMD Systems portfolio is supported by two Research, Development, Test & Evaluation (RDT&E) program elements (0303310D8Z for RDT&E of advanced materiel and non-materiel solutions, and 0607310D8Z for upgrades or improvements to fielded systems), as well as an Operations and Maintenance (O&M) "CWMD Sustainment" line (ORC-2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0607310D8Z *I Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*

This Program Element (PE) will fund travel to support the requirements of this program.

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research, development and test and evaluation efforts.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	2.948	1.901	5.926	-	5.926
Current President's Budget	2.849	1.898	4.194	-	4.194
Total Adjustments	-0.099	-0.003	-1.732	-	-1.732
• Congressional General Reductions	0.000	-			
• Congressional Directed Reductions	0.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	0.000	-			
• Congressional Directed Transfers	0.000	-			
• Reprogrammings	-0.001	-			
• SBIR/STTR Transfer	-0.098	-			
• FFRDC	-	-0.003	-	-	-
• Adjustment for availablility of prior year execution balances	-	-	-1.551	-	-1.551
• Efficiencies adjustment	-	-	-0.116	-	-0.116
• Economic assumptions adjustment	-	-	-0.045	-	-0.045
• Fiscal guidance adjustment	-	-	-0.020	-	-0.020

Change Summary Explanation

The FY 2017 funding request was reduced by ($1.551) million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	Project (Number/Name) P242 / *Operational System Development*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
P242: *Operational System Development*	1.872	2.849	1.898	4.194	-	4.194	7.572	7.443	6.917	7.052	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The CWMD Systems program is researching, developing, integrating, testing, and deploying a CWMD situational awareness system. This system will enable a comprehensive, global capability for situational awareness of threats from WMD as well as global efforts to counter those threats. This system will enable a shared understanding of the CWMD operating environment and will support planning and decision-making by the U.S. government and its partners. The CWMD mission space is characterized by immense amounts of information, such as the characteristics and location of WMD-related facilities and materials, personnel and expertise, and dual-use technologies. The CWMD Systems program comprises next-generation advanced information technologies, coupled with affiliated fusion cells, to locate, gather, access, share, and visualize this WMD-relevant information to facilitate collaboration and decision-making. These solutions will revolutionize CWMD knowledge management, providing decision makers and operational personnel a dynamic, tailorable, and holistic view of the global CWMD operating environment.

The diversity and complexity of the CWMD mission requires an integrated approach toward capability development, based on a systems perspective that links strategic objectives with interrelated tasks and associated capabilities. The CWMD mission is intertwined with counter-terrorism and homeland defense and hence system development must leverage and integrate complementary technologies developed to support other mission areas. The CWMD Systems program also will enable international collaboration in countering WMD by breaking down unnecessary data stove-pipes and by enabling the U.S. Government and its partners to access and share knowledge.

This program also responds to the strategic needs outlined in the 2014 QDR, the DoD Strategy for Countering WMD, the FY2016-2020 DPG, and capability requirements approved by the JROC. The CWMD Systems program will develop and field a global CWMD situational awareness capability to meet the needs of Combatant Commands, the OSD, the Joint Staff, the Services, and Defense Agencies. Other U.S. Government Departments and Agencies will be able to utilize this capability to support their mission needs and collaborate with the DoD. This program is designed to leverage existing DoD resources and proven approaches to achieve its goals and rapidly deliver an operational capability.

The CWMD Systems portfolio is supported by two RDT&E program elements (0303310D8Z for RDT&E of advanced materiel and non-materiel solutions, and 0607310D8Z for upgrades or improvements to fielded systems), as well as an O&M line "CWMD Sustainment" (ORC-2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

This PE will fund travel to support the requirements of this program.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	**Project (Number/Name)** P242 / *Operational System Development*

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research, development and test and evaluation efforts.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: CWMD Systems: Operational Systems Development	2.849	1.898	4.194
Description: • Upgrade and improve fielded CWMD situational awareness systems and system components to locate, gather, fuse, share, and visualize WMD and CWMD information, facilitate collaboration, and support planning and decision-making. • Address the prioritized capability needs of existing information systems and other platforms to augment, upgrade and enhance core CWMD capabilities. • Provide upgrades and enhancements to previous software capability releases, providing continuity and compatibility across the systems.			
FY 2015 Accomplishments: • Upgraded and enhanced capabilities in deployed CWMD situational awareness systems. • Integrated, upgraded and enhanced existing data sources, applications, widgets and tools from the Defense Intelligence Agency (DIA) into existing and prototype information systems. • Supported semi-annual collection, validation, and prioritization of capability needs for updated and new system capabilities. • Updated and integrated infrastructure and systems required for fusion cells complementing Constellation prototype information system.			
FY 2016 Plans: • Upgrade and enhance capabilities in deployed CWMD situational awareness systems. • Integrate and upgrade or enhance existing data sources, applications, widgets and tools from the DIA into existing and prototype information systems. • Support semi-annual collection, validation, and prioritization of capability requirements needs for updated and new system capabilities. • Update and integrate infrastructure and systems required for fusion cells complementing Constellation prototype information system.			
FY 2017 Plans: • Continue to upgrade and enhance deployed capabilities in Constellation prototype and other CWMD situational awareness systems. • Support semi-annual collection, validation, and prioritization of capability requirements for updated and new system capabilities. • Support comprehensive review of infrastructure and systems required for fusion cells and Constellation end users in Combatant Commands and other DoD Components, U.S. agencies, and key Allied government agencies.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	**Project (Number/Name)** P242 / *Operational System Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Build/upgrade/modify the infrastructure, including hardware and software for computational and processing capabilities, training, and organizational support.			
Accomplishments/Planned Programs Subtotals	2.849	1.898	4.194

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Assess utility of Constellation information system beginning with the deployment of a developmental prototype in FY16 with incremental capability releases that mature into an operational CWMD situational awareness capability, through application of agile infrastructure and software development methodologies.

E. Performance Metrics

Success in this area is measured by compliance with various statutes and DoD directives that govern the conduct of the affairs within the Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (OASD/NCB). Maintain cost, schedule, and performance reporting, review, and adjudication. Maintain requirements traceability matrix.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	**Project (Number/Name)** P242 / *Operational System Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	TBD	VAR - Various : TBD	1.872	2.849		0.949		2.097		-		2.097	Continuing	Continuing	-
Test and Evaluation	Various	Support Cells : DTRA and DIA	-	-		0.626		1.384		-		1.384	Continuing	Continuing	-
Management Services	FFRDC	MITRE & JHU-APL : MA & VA	-	-		0.323		0.713		-		0.713	Continuing	Continuing	-
		Subtotal	1.872	2.849		1.898		4.194		-		4.194	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.872	2.849		1.898		4.194		-		4.194	-	-	-

Remarks

This appropriation will finance work, including manpower, performed by a government agency or by private individuals or organizations under a contractual or grant arrangement with the government who conduct research (systematic study directed toward fuller scientific knowledge or understanding of the subject studied), development (systematic use of the knowledge and understanding gained from research, for the production of useful materials, devices, systems, or methods, including the design and development of prototypes and processes) and test and evaluation efforts.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	**Project (Number/Name)** P242 / *Operational System Development*

Constellation Schedule

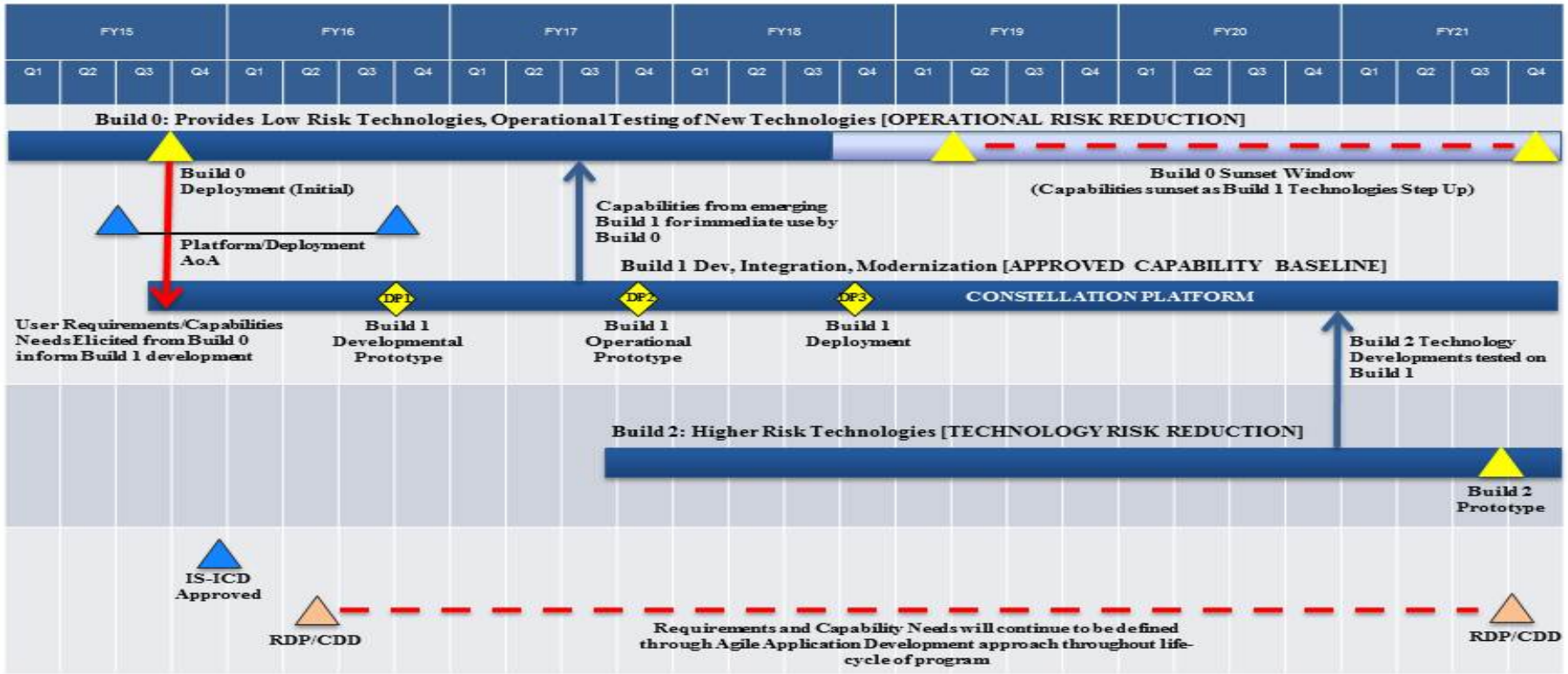


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0607310D8Z / *Countering Weapons of Mass Destruction (CWMD) Systems: Operational Systems Development*	**Project (Number/Name)** P242 / *Operational System Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Constellation Build 0: OPERATIONAL RISK REDUCTION				
Operational Testing of New Technologies	1	2014	4	2021
Initial Deployment	3	2015	3	2015
Incorporate capabilities from emerging Build 1 for immediate use by Build 0	3	2017	3	2017
Sunset Window (Capabilities sunset an Build 1 technologies step-up)	2	2019	4	2021
Constellation Build 1: APPROVED CAPABILITIES BASELINE				
Develop, Integration & Modernization	3	2015	4	2021
Analysis of Alternatives (AoA)	3	2015	4	2016
Build 1 Developmental Prototype (DP1)	4	2016	4	2016
Build 1 Operational Prototype (DP2)	4	2017	4	2017
Build 1 Deployment (DP3)	4	2018	4	2018
Build 2 technology developments tested on Build 1	4	2020	4	2020
Constellation Build 2: TECHNOLOGY RISK REDUCTION				
Higher Risk Technologies	3	2017	4	2021
Prototype	3	2021	3	2021
Requirements and Capabilities Needs				
Information Systems Initial Capabilities Document (IS ICD) Approved	4	2015	4	2015
Requirements Definition Package (RDP) / Capability Development Document (CDD)	2	2016	2	2016
Agile Requirements and Capabilities Development	2	2016	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	10.313	10.933	8.940	8.876	-	8.876	9.594	10.188	10.319	10.518	Continuing	Continuing
140: *Information Systems Security Program*	10.313	10.933	8.940	8.876	-	8.876	9.594	10.188	10.319	10.518	Continuing	Continuing

A. Mission Description and Budget Item Justification

The DoD CIO Information Systems Security Program (ISSP) provides for focused research, development, testing and integration of technology and technical solutions critical to the Defense Cybersecurity and Information Assurance Program to meet the requirements of 10 USC 2224 (Defense Information Assurance Program), 44 USC 3544, (Federal Information Security Management Act of 2002), OMB Circular A-130, and DoD Directives/Instructions 8500, 8510, 8520, 8530, and 8540. This program is funded under Budget activity 7, Operational System Development because it integrates technology and technical solutions to the Defense Information Assurance Program.

ISSP RDT&E funds support the DoD CIO and its mission partners on architecting, engineering, and technical matters for developing governance processes and structures; on evolving and enabling a more integrated and synchronized Joint Information Environment that will leverage a single and converged joint enterprise IT platform; on the continued development of the U.S. Government's ability to prevent and defend against adversarial and/or commercial information and communications technology supply-chain attacks on its mission critical systems, networks, and devices; on improving oversight of the life-cycle management of cybersecurity risks; and on the integration of cybersecurity standards, methods, and procedures across the DoD for a more robust and resilient cybersecurity posture.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	11.288	8.957	9.148	-	9.148
Current President's Budget	10.933	8.940	8.876	-	8.876
Total Adjustments	-0.355	-0.017	-0.272	-	-0.272
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.351	-			
• Program Adjustments	-0.004	-	-0.031	-	-0.031
• FFRDC Reduction	-	-0.017	-	-	-
• Efficiency Reduction	-	-	-0.182	-	-0.182
• Economic Assumptions	-	-	-0.059	-	-0.059

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*

Change Summary Explanation

FY 2015: SIBR/STTR reduction -0.351 million, Program Adjustment -0.004 million.

FY 2016: FFRDC Reduction -0.017 million.

FY 2017: Efficiency Adjustment -0.182 million, Economic Assumption -0.059 Million, Program Adjustment -0.031 million.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / *Information Systems Security Program*	Project (Number/Name) 140 / *Information Systems Security Program*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
140: *Information Systems Security Program*	10.313	10.933	8.940	8.876	-	8.876	9.594	10.188	10.319	10.518	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The DoD CIO Information Systems Security Program (ISSP) provides for focused research, development, testing and integration of technology and technical solutions critical to the Defense Cybersecurity and Information Assurance Program to meet the requirements of 10 USC 2224 (Defense Information Assurance Program), 44 USC 3544, (Federal Information Security Management Act of 2002), OMB Circular A-130, and DoD Directives/Instructions 8510, 8530 and 8540. This program is funded under Budget activity 7, Operational System Development because it integrates technology and technical solutions to the Defense Information Assurance Program.

ISSP RDT&E funds support the DoD CIO and its mission partners on architecting, engineering, and technical matters for developing governance processes and structures; on evolving and enabling a more integrated and synchronized Joint Information Environment that will leverage a single and converged joint enterprise IT platform; on the continued development of the U.S. Government's ability to prevent and defend against commercial information and communications technology supply-chain attacks on its mission critical systems, networks, and devices; on improving oversight of the life-cycle management of cybersecurity risks; and on the integration of cybersecurity standards, methods, and procedures across the DoD for a more robust and resilient cybersecurity posture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Information Systems Security Program Plans and Accomplishments	10.933	8.940	8.876
FY 2015 Accomplishments: Continued support for, and development of, a single security architecture for: evolving the Joint Information Environment (JIE) and the JIE Regional Security Stacks (JRSS); to support the migration strategy and implementation plan for moving from the current construct to the JRSS framework; for data center and other critical mission infrastructure protection; for key technology insertions as needed; and the respective supporting cybersecurity policies and strategies. • Continued development and implementation of policies, strategies, and architectures for successful computer network defenses and operations in the event of large-scale cyber incidents by sophisticated cyber adversaries. Includes cybersecurity exercises, cyber incident response, computer network defense operations, resiliency, and outreach and engagement with mission partners as required. • Conducted research and analyses regarding security and potential threats to the Global Positioning System (GPS) and Positioning, Navigation, and Timing (PNT), the GPS Master Control Station analyses; and GPS Legacy Software Integrity.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Conducted research to develop means of assessing and prioritizing supply-chain threats and responses, for training regarding threats and risks, and for program protection plans to address supply-chain risks -- to help ensure implementation of consistent protection practices from supply chain exploitation and attack within/by individual procurements of materiel and services on which the DoD systems, networks, and missions depend. Also continued development of an overarching international standard, and provide enhancements to integrate a family of existing standards, for improving supply-chain-risk-management practices. • Supported development and implementation of more robust governance mechanisms, including organizational policy documents that provide technical guidance and direction to the U.S. Government cross domain community, to minimize supply chain risks across the DoD components and activities. This included development of a Mission-Essential-elements-of-Information (MEI) framework to identify and investigate international cybersecurity policies, and practices that impact the abilities of US Forces to engage in both peacetime and in conflict scenarios, in collaboration with mission partners & non-governmental partners... • Continued to develop and publish supportive standards, guidance, and processes on the web-based Knowledge Service, for the continual reauthorization and cyber strengthening of information systems, and in satisfaction of requirements mandated by OMB Circular A-130. Continued software development and support to facilitate Defense Knowledge Service requirements and data updates. • Continued to support key acquisition programs-of-record (i.e., Major Automated Information Systems; Major Defense Acquisition Programs, and other special interest developmental and acquisition activities) to drive the development and implementation of more effective cybersecurity strategies, risk management plans, and processes. Included detailed analyses of Cybersecurity, Supply-Chain-Risk-Management, and Program-Protection-Plan artifacts in support of high risk programs In collaboration with OUSD/AT&L, continued development of a capability-based adversary cyber threat model for use in requirements and acquisition, to help insure realistic (cost effective) requirements for high risk programs. • Supported analysis to develop means for improving mission assurance, mitigation analyses, and vulnerability detection via hardware and software testing, and to help insure acquisitions are better integrated with informed threat prospects. • Provided for technical support for requirements of the Federal Risk and Authorization Management Program (FEDRAMP) for Cloud computing services, and for developing requisite security requirements -- policies, programs, & pilots -- for all wireless and mobile devices (including commercial) being deployed Department-wide. Continued implementation and oversight of the policies and capabilities to support the DoD Cloud and mobile device strategies and roadmaps. Develop, publish, and refine DoD			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
mobility strategy, and processes for use of commercial Cloud providers. Develop Cloud computing security guidance that details cybersecurity guidance and procedures for use by potential commercial Cloud service providers. ***FY 2016 Plans:*** • Continue to develop and provide required engineering support for critical architectures, to include the Joint Information Environment, C4I tactical networks, and for coalition and other mission partners. Continue to develop, refine, and implement a Joint Information Environment single security architecture strategy, and the related strategic metrics and enhanced analytical capabilities. • Continue to develop and implement strategies for successful defenses and operations in the event of sophisticated cyber adversaries and large-scale cyber incidents. • Continue to research to develop means of assessing and prioritizing supply-chain threats and responses, for training regarding threats and risks, and for program protection plans to address supply-chain risks, to help ensure implementation of consistent protection practices from supply chain exploitation and attack within/by individual procurements of materiel and services on which the DoD systems, networks, and missions depend.. • Continue development and implementation of a more robust governance mechanism to minimize supply chain risks across the DoD components and activities, and to develop an overarching international standard, or an improved integrated family of existing standards, for improving supply-chain-risk-management. • Continue to develop the means for improved mission assurance, mitigation analyses, and vulnerability detection via hardware and software testing, and for acquisitions that are better integrated with informed threat prospects. • Continue to develop and publish supportive standards, guidance, and processes on the web-based Knowledge Service, for the continual reauthorization and cyber strengthening of information systems, and in satisfaction of requirements mandated by OMB Circular A-130. • Continue to support key acquisition programs-of-record (i.e., Major Automated Information Systems; Major Defense Acquisition Programs, and other special interest developmental and acquisition activities) to drive the development and implementation of more effective cybersecurity strategies, risk management plans, and processes. • Continue to develop, publish, and refine DoD mobility strategy, and processes for use of commercial Cloud providers; to develop Cloud computing security guidance that details cybersecurity guidance and procedures for use by potential commercial Cloud			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
service providers, and continued oversight of policies and capabilities to support comprehensive cybersecurity capability for the Joint Information Environment (JIE), including the DoD Cloud and mobile device strategies and roadmaps. ***FY 2017 Plans:*** • Continue to develop and provide required engineering support for critical architectures, to include the Joint Information Environment, C4I tactical networks, and for coalition and other mission partners. Continue to develop, refine, and implement a Joint Information Environment single security architecture strategy, and the related strategic metrics and enhanced analytical capabilities. • Continue to develop and implement strategies for successful defenses and operations in the event of sophisticated cyber adversaries and large-scale cyber incidents. • Continue to research to develop means of assessing and prioritizing supply-chain threats and responses, for training regarding threats and risks, and for program protection plans to address supply-chain risks, to help ensure implementation of consistent protection practices from supply chain exploitation and attack within/by individual procurements of materiel and services on which the DoD systems, networks, and missions depend.. • Continue development and implementation of a more robust governance mechanism to minimize supply chain risks across the DoD components and activities, and to develop an overarching international standard, or an improved integrated family of existing standards, for improving supply-chain-risk-management. • Continue to develop the means for improved mission assurance, mitigation analyses, and vulnerability detection via hardware and software testing, and for acquisitions that are better integrated with informed threat prospects. • Continue to develop and publish supportive standards, guidance, and processes on the web-based Knowledge Service, for the continual reauthorization and cyber strengthening of information systems, and in satisfaction of requirements mandated by OMB Circular A-130. • Continue to support key acquisition programs-of-record (i.e., Major Automated Information Systems; Major Defense Acquisition Programs, and other special interest developmental and acquisition activities) to drive the development and implementation of more effective cybersecurity strategies, risk management plans, and processes. • Continue to develop, publish, and refine DoD mobility strategy, and processes for use of commercial Cloud providers; to develop Cloud computing security guidance that details cybersecurity guidance and procedures for use by potential commercial Cloud			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
service providers, and continued oversight of policies and capabilities to support comprehensive cybersecurity capability for the Joint Information Environment (JIE), including the DoD Cloud and mobile device strategies and roadmaps.			
Accomplishments/Planned Programs Subtotals	10.933	8.940	8.876

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0303140D8Z O&M DW: *Information System Security Program*	10.992	13.490	11.321	-	11.321	11.644	11.307	11.459	11.687	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Annual FISMA metrics
- Evolving JIE cybersecurity metrics

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Studies Analysis	Various	Various : Various	0.795	1.057	Jul 2015	0.840	Jul 2016	0.861	Jul 2017	-		0.861	Continuing	Continuing	Continuing
Technical Engineering Services	Various	Various : Various	5.216	5.305	Jul 2015	4.486	Jul 2016	4.289	Jul 2017	-		4.289	Continuing	Continuing	Continuing
Services Supporty	Various	Various : Various	0.099	0.105	Jul 2015	0.083	Jul 2016	0.086	Jul 2017	-		0.086	Continuing	Continuing	Continuing
		Subtotal	6.110	6.467		5.409		5.236		-		5.236	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	0.200	0.212	Jul 2015	0.168	Jul 2016	0.173	Jul 2017	-		0.173	Continuing	Continuing	Continuing
Engineering Support	FFRDC	Various : Various	2.910	3.092	Jul 2015	2.440	Jul 2016	2.520	Jul 2017	-		2.520	Continuing	Continuing	Continuing
R&D Support	Various	Various : Various	1.093	1.162	Jul 2015	0.923	Jul 2016	0.947	Jul 2017	-		0.947	Continuing	Continuing	Continuing
		Subtotal	4.203	4.466		3.531		3.640		-		3.640	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.313	10.933		8.940		8.876		-		8.876	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*	

R4

PE: 0303140D8Z/ Information Systems Security Program

Funding supports focused research, development, testing and integration of technology and technical solutions critical to the Defense Information Assurance Program (10 USC 2224) through pilot programs and technology demonstration; investment in high leverage, near-term programs that offer immediate Information Assurance (IA) benefit.

	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020	10/1/2021
FY2014 Program Execution								
FY2015 Program Execution								
FY2016 Program Execution								
FY2017 Program Execution								
FY2018 Program Execution								
FY2019 Program Execution								
FY2020 Program Execution								

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303140D8Z / *Information Systems Security Program*	**Project (Number/Name)** 140 / *Information Systems Security Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 Project Execution	1	2015	4	2016
FY16 Project Execution	1	2016	4	2017
FY17 Project Execution	1	2017	4	2018
FY18 Project Execution	1	2018	4	2019
FY 19 Project Execution	1	2019	4	2020
FY 20 Project Execution	1	2020	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	1.142	0.925	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
891: *Defense Military Deception Program*	1.142	0.925	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program and associated funding moved from BA-07 to BA-06 in FY 2016 to better reflect the mission of the program

A. Mission Description and Budget Item Justification

The Defense Military Deception Program (DMDP) is an effort to revitalize Department of Defense (DoD) Military Deception (MILDEC) capability and capacity across the DoD. DMDP executes Research, Development, Test, and Evaluation (RDT&E) on MILDEC capabilities, next generation devices, and technologies to support emerging Department requirements. DMDP integrates RDT&E prototypes with DoD Component Programs for acquisition, sustainment and maintenance.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.949	0.000	0.000	-	0.000
Current President's Budget	0.925	0.000	0.000	-	0.000
Total Adjustments	-0.024	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.024	-			

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Military Deception Program Office	0.925	-	-
FY 2015 Accomplishments: - Researched, developed and tested high-fidelity next generation decoys and capabilities to meet Combatant Commands (CCMD) and DoD Component MILDEC requirements. - Developed technology feasibility reports on potential deception threats to U.S. systems.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Ensured developed prototypes and capabilities transitioned into formalized program offices and program executive offices across DoD Components. - Participated in Defense RDT&E processes to advance basic and applied research, science and technology, and technology development and testing to elevate MILDEC capability and capacity across the Department.			
Accomplishments/Planned Programs Subtotals	0.925	-	-

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0303260D8Z O&M DW: *Defense Military Deception Program Office*	3.611	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

N/A

E. Acquisition Strategy

The acquisition, management, and contracting strategy involves the following:
• Adhere to guidance outlined in DoD 5000, Directive 7, Federal Acquisition Regulations (FAR), and FAR Supplement Policies and Procedures.
• Acquire and sustain MILDEC capabilities, systems, tools, products and services through a disciplined, yet agile, process that ensures information related capabilities are available for DoD components.
• Sustain an acquisition process that is responsive and responsible to internal and external customers and stakeholders.
• Continue to support the warfighter's need for capabilities that dominate today's dynamic, networked battlespace by providing governance, oversight and strategy across the DoD for the planning and execution of MILDEC activities.

F. Performance Metrics

RDT&E performance metrics are among the metrics used to establish the baseline and assess progress toward revitalization of MILDEC capabilities and capacities across the DoD's assigned responsibilities. The following metrics are based on the return on investment of RDT&E investments and provide assessment to meeting: 1) operational requirements for MILDEC capabilities, 2) technical requirements for successful engineering, and 3) programmatic requirements for sustaining RDT&E successes across the Department:
Performance metrics are measured through an increase of MILDEC capability and capacity as demonstrated by the following:
- Seventy percent of evaluations and tests on engineered prototypes and next generation capabilities address CCMD and/or DoD Component requirements. The remaining thirty percent serve as the pivot to improve service level operational capabilities or to address alternate technologies.
- One hundred percent of completed prototype development includes affiliated specifications, architecture, raw material inventories and documentation. They are maintained in a centralized database repository used to support feedback and future efforts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*

- Fifty percent of prototypes and next generation capabilities transition into DoD Component Program Management Offices and Program Executive Offices to fulfill DoD urgent needs, while the remaining fifty percent are reviewed for alternative operational utility and sent to the appropriate Service or Agency for application.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*	**Project (Number/Name)** 891 / *Defense Military Deception Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
High Fidelity Decoys	Option/ Various	N/A : N/A	0.800	0.664		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.800	0.664		0.000		0.000		-		0.000	-	-	-

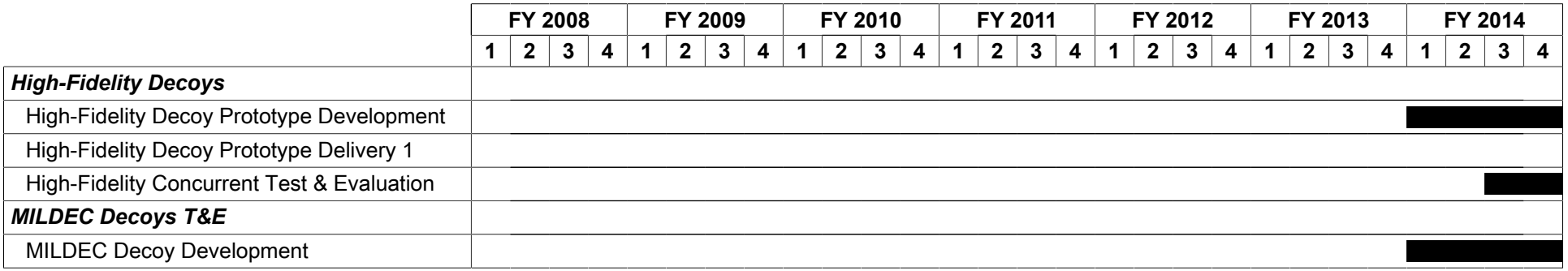
Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MILDEC Decoys T&E	Option/ Various	N/A : N/A	0.342	0.261		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.342	0.261		0.000		0.000		-		0.000	-	-	-

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.142	0.925		0.000		0.000		-		0.000	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*	**Project (Number/Name)** 891 / *Defense Military Deception Program*



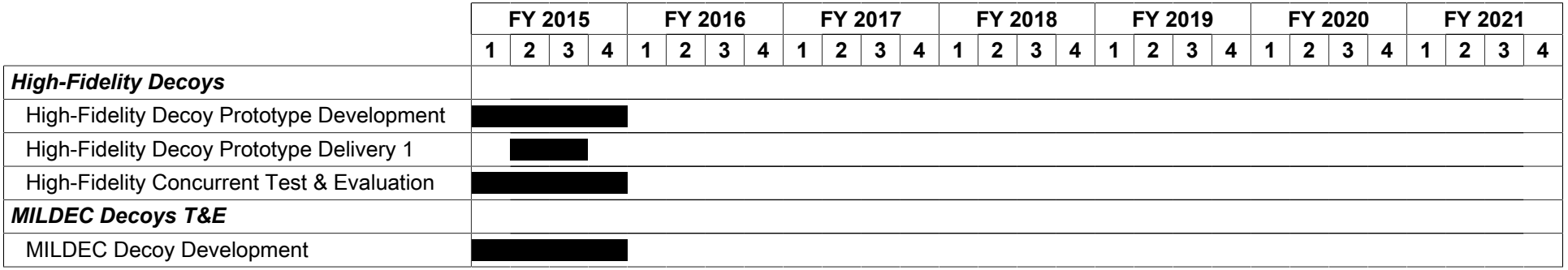


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0303260D8Z / *Defense Military Deception Program Office*	**Project (Number/Name)** 891 / *Defense Military Deception Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
High-Fidelity Decoys				
High-Fidelity Decoy Prototype Development	1	2014	4	2015
High-Fidelity Decoy Prototype Delivery 1	2	2015	3	2015
High-Fidelity Concurrent Test & Evaluation	3	2014	4	2015
MILDEC Decoys T&E				
MILDEC Decoy Development	1	2014	4	2015

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	31.864	8.702	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
125: *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*	31.864	8.702	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Critical Infrastructure Program (DCIP) is a Department of Defense (DoD) risk management program that seeks to ensure the availability of assets critical to DoD missions. These include DoD and non-DoD, domestic and foreign infrastructures essential to planning, mobilizing, deploying, executing, and sustaining United States military operations on a global basis. Through identifying Defense Critical Assets, assessing them to determine vulnerabilities, incorporating specific threat and hazard information and analysis, and visually displaying relevant infrastructure data and analysis, DoD will be positioned to make risk management decisions to ensure the appropriate infrastructure is available, when needed, to support DoD missions.

Specifically, DCIP works with the Combatant Commands (CCMD) to determine the mission capability requirements and coordinates with the Military Departments, Defense Agencies, DoD Field Activities, and Defense Sector Lead Agents (DISLA) to identify and prioritize defense critical infrastructure required to support assigned mission essential tasks. DCIP also works with mission and asset owners to identify vulnerabilities and apply appropriate remediation and mitigation measures. DCIP leverages the DISLA inputs to identify the specific functions, systems, assets (DoD and non-DoD owned), and interdependencies within the Defense Sector infrastructure networks that support the identified critical missions. Each DISLA, as identified in DoDD 3020.40 “DoD Policy and Responsibilities for Critical Infrastructure”, represents one of ten (10) functional areas that provide support to the CCMDs and asset owners. These functional areas are as follows: defense industrial base (DIB); financial services; DoD Information Networks (DODIN); health affairs; intelligence; logistics; personnel; public works; space; and transportation.

In addition, DCIP manages specific analytic efforts to identify inter- and intra-dependencies DoD has on the critical commercial infrastructure supporting identified missions. Specific analytic efforts are focused within six (6) commercial infrastructure areas: energy (electric power, natural gas); chemicals; transportation; communications; water; and petroleum, oil, lubricants (POL).

For each functional area and commercial infrastructure area, DCIP examines specific vulnerabilities to DoD missions and develops remediation and mitigation options, incorporating unique analytic insights from engineering and industry best practices to reduce the risk to missions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305125D8Z *I Critical Infrastructure Protection (CIP)*

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	8.834	0.000	0.000	-	0.000
Current President's Budget	8.702	0.000	0.000	-	0.000
Total Adjustments	-0.132	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-0.129	-			

Change Summary Explanation

The Office of the Under Secretary of Defense for Policy (OUSD(P)) re-aligned funds to the specific Sector leads in the Military Departments and Defense Agencies that are responsible for the implementation of designated DCIP missions beginning in FY16. OUSD(P) retains program oversight responsibilities.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*	Project (Number/Name) 125 / *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
125: *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*	31.864	8.702	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Critical Infrastructure Program (DCIP) is a Department of Defense (DoD) risk management program that seeks to ensure the availability of assets critical to DoD missions. These include DoD and non-DoD, domestic and foreign infrastructures essential to planning, mobilizing, deploying, executing, and sustaining United States military operations on a global basis. Through identifying Defense Critical Assets, assessing them to determine vulnerabilities, incorporating specific threat and hazard information and analysis, and visually displaying relevant infrastructure data and analysis, DoD will be positioned to make risk management decisions to ensure the appropriate infrastructure is available, when needed, to support DoD missions.

Specifically, DCIP works with the Combatant Commands (CCMD) to determine the mission capability requirements and coordinates with the Military Departments, Defense Agencies, DoD Field Activities, and Defense Sector Lead Agents (DISLA) to identify and prioritize defense critical infrastructure required to support assigned mission essential tasks. DCIP also works with mission and asset owners to identify vulnerabilities and apply appropriate remediation and mitigation measures. DCIP leverages the DISLA inputs to identify the specific functions, systems, assets (DoD and non-DoD owned), and interdependencies within the Defense Sector infrastructure networks that support the identified critical missions. Each DISLA, as identified in DoDD 3020.40 “DoD Policy and Responsibilities for Critical Infrastructure”, represents one of ten (10) functional areas that provide support to the CCMDs and asset owners. These functional areas are as follows: defense industrial base (DIB); financial services; DoD Information Networks (DODIN); health affairs; intelligence; logistics; personnel; public works; space; and transportation.

In addition, DCIP manages specific analytic efforts to identify inter- and intra-dependencies DoD has on the critical commercial infrastructure supporting identified missions. Specific analytic efforts are focused within six (6) commercial infrastructure areas: energy (electric power, natural gas); chemicals; transportation; communications; water; and petroleum, oil, lubricants (POL).

For each functional area and commercial infrastructure area, DCIP examines specific vulnerabilities to DoD missions and develops remediation and mitigation options, incorporating unique analytic insights from engineering and industry best practices to reduce the risk to missions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Defense Critical Infrastructure Program (DCIP)	8.702	-	-
Description: The Defense Critical Infrastructure Program (DCIP) is a Department of Defense (DoD) risk management program that seeks to ensure the availability of networked assets critical to DoD missions, to include DoD and non-DoD, domestic and			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*	**Project (Number/Name)** 125 / *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
foreign infrastructure essential to planning, mobilizing, deploying and sustaining United States military operations on a global basis. ***FY 2015 Accomplishments:*** - Continue MARMS system development which will be the common database for the DCIP program. - Provide technical analysis of the Cyber Critical Asset Identification Process in order to improve the overall process. - Provide technical analysis of the energy grid in support of the DCIP and national critical infrastructure programs. - Provide technical analysis and recommendations on infrastructure networks, points of service, interdependencies, and priority restoration for pre-event and post-event analysis for manmade or natural disaster incidents.			
Accomplishments/Planned Programs Subtotals	8.702	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

DCIP uses the performance metrics documented in the DCIP Program Plan. These metrics are based on the requirements and responsibilities listed in DoDD 3020.40 and DoDI 3020.45.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*	**Project (Number/Name)** 125 / *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Defense Critical Infrastructure Program	MIPR	Various : Various	31.864	8.702	Mar 2015	-		-		-		-	-	-	-
		Subtotal	31.864	8.702		-		-		-		-	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.864	8.702		0.000		-		-		-	-	-	-

Remarks

The Defense Critical Infrastructure Program (DCIP) is a Department of Defense (DoD) risk management program that seeks to ensure the availability of networked assets critical to DoD missions, to include DoD and non-DoD, domestic and foreign infrastructure essential to planning, mobilizing, deploying and sustaining United States military operations on a global basis.

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*	**Project (Number/Name)** 125 / *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Critical Infrastructure Protection Management																												
Critical Assets Assessments																												

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305125D8Z / *Critical Infrastructure Protection (CIP)*	**Project (Number/Name)** 125 / *CRITICAL INFRASTRUCTURE PROTECTION (CIP)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Critical Infrastructure Protection Management				
Critical Assets Assessments	1	2015	4	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305186D8Z / *Policy R&D Programs*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	15.464	7.005	4.175	6.204	-	6.204	6.619	6.895	6.954	7.024	Continuing	Continuing
186: *Policy R&D Programs*	15.464	7.005	4.175	6.204	-	6.204	6.619	6.895	6.954	7.024	Continuing	Continuing

A. Mission Description and Budget Item Justification

Provide analysis to overcome military security challenges. Since the global environment is dynamic, research is necessary for continued understanding military structures, foreign cultures, and ethnic issues. Examines demographic data, investigates future global security challenges, provides insights to inform critical national security decisions, explores ways to build partnership capabilities to counter organizational warfare, develop foreign military infrastructure, and deny sanctuary to extremist groups. Program blends several disciplines including surveillance, operations, policy, information management, cyber policy, training and technology.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	7.055	4.182	3.223	-	3.223
Current President's Budget	7.005	4.175	6.204	-	6.204
Total Adjustments	-0.050	-0.007	2.981	-	2.981
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-0.047	-			
• Internal Adjustment	0.000	-0.007	2.981	-	2.981

Change Summary Explanation

FY 2017 adjustment made to support OUSD(P) programmed requirements and contract efficiencies.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305186D8Z / *Policy R&D Programs*	Project (Number/Name) 186 / *Policy R&D Programs*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
186: *Policy R&D Programs*	15.464	7.005	4.175	6.204	-	6.204	6.619	6.895	6.954	7.024	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provide analysis to overcome military security challenges. Since the global environment is dynamic, research is necessary for continued understanding military structures, foreign cultures, and ethnic issues. Examines demographic data, investigates future global security challenges, provides insights to inform critical national security decisions, explores ways to build partnership capabilities to counter organizational warfare, develop foreign military infrastructure, and deny sanctuary to extremist groups. Program blends several disciplines including surveillance, operations, policy, information management, cyber policy, training and technology.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Future Security Challenges	3.530	2.409	1.833

Description: Provides program management oversight and technical support to identify current and emerging future security challenges to the Department, and for international cooperation activities to understand and confront with Allies and partners with international partners to confront these challenges. Anticipates exploitation of technology, including available and advanced capabilities, and works with the international commercial sector and academia concerning adversary's application of technology. Program explores processes and policy to integrate international capabilities across the spectrum of security challenges.

FY 2015 Accomplishments:
- Perform trend analysis and develop mitigation options for addressing program risks.
- Finalize and apply risk management methodologies to identified program areas.
- Develop net-centric enterprise technologies to remove international sharing barriers identified with maritime information, intelligence, and data being collected by DoD and foreign governments
- Research military competition among nations in the Far and Middle East and highlight potential capabilities and policies each nation may utilize in future armed conflicts
- Enhance strategies and relationships with European nations based on the exchange of information through education opportunities and existing policies
- Research and analyze particular Far and Middle East countries as it relates to their decision-making process, financial position, leadership, political dynamics, technical abilities and internal social tensions and stability.
- Continue research efforts within the Services and Combatant Commands to better analyze and demonstrate enduring counterinsurgency operational capabilities.

FY 2016 Plans:
- Perform trend analysis and develop mitigation options for addressing program risks.
- Finalize and apply risk management methodologies to identified program areas.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305186D8Z / *Policy R&D Programs*	**Project (Number/Name)** 186 / *Policy R&D Programs*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
• Develop net-centric enterprise technologies to remove international sharing barriers identified with maritime information, intelligence, and data being collected by DoD and foreign governments • Research military competition among nations in the Far and Middle East and highlight potential capabilities and policies each nation may utilize in future armed conflicts • Enhance strategies and relationships with European nations based on the exchange of information through education opportunities and existing policies • Research and analyze particular Far and Middle East countries as it relates to their decision-making process, financial position, leadership, political dynamics, technical abilities and internal social tensions and stability. • Continue research efforts within the Services and Combatant Commands to better analyze and demonstrate enduring counterinsurgency operational capabilities. ***FY 2017 Plans:*** • Perform trend analysis and develop mitigation options for addressing program risks. • Finalize and apply risk management methodologies to identified program areas. • Develop net-centric enterprise technologies to remove international sharing barriers identified with maritime information, intelligence, and data being collected by DoD and foreign governments • Research military competition among nations in the Far and Middle East and highlight potential capabilities and policies each nation may utilize in future armed conflicts • Enhance strategies and relationships with European nations based on the exchange of information through education opportunities and existing policies • Research and analyze particular Far and Middle East countries as it relates to their decision-making process, financial position, leadership, political dynamics, technical abilities and internal social tensions and stability. • Continue research efforts within the Services and Combatant Commands to better analyze and demonstrate enduring counterinsurgency operational capabilities.			
Title: Long Term Competitions (LTC) Program ***Description:*** Request supports the Long Term Competitions (LTC) program which is an analytical effort chartered to provide the DoD senior leadership with an understanding of key long-term developments and dynamics in specific areas of the global security environment, and to develop competitive strategies for their consideration as the Department seeks to address these long term challenges. The LTC Program will provide rigorously analyzed competitive strategy recommendations to these senior DoD leaders, and will require the support of organizations and experts outside of government to deliver the highest quality analysis, concepts and recommendations. Funding for the LTC program will be used to: bring outside experts into Task Force working groups and strategy review teams; contract studies; support wargaming and workshops; conduct analytical studies of key developments and dynamics, and their impact on the future security environment and U.S. military capabilities in that environment; and explore new approaches to addressing key analytical requirements.	1.815	0.905	3.686

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305186D8Z / *Policy R&D Programs*	**Project (Number/Name)** 186 / *Policy R&D Programs*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Assessments of the ability of future forces to achieve objectives at the campaign level. These assessments include wargaming, qualitative, and quantitative analytic methods. They will both inform and be informed by the Support for Strategic Analysis (SSA) defense planning scenarios (DPS). They will identify risk and potential trade-space among force structure, capabilities, and readiness to inform senior leader decision-making. ***FY 2015 Accomplishments:*** Specific efforts are classified. ***FY 2016 Plans:*** Specific efforts are classified. ***FY 2017 Plans:*** Specific efforts are classified.			
Title: Defense Planning Scenarios Activities ***Description:*** This program is classified. ***FY 2015 Accomplishments:*** Specific efforts are classified. ***FY 2016 Plans:*** Specific efforts are classified. ***FY 2017 Plans:*** Specific efforts are classified.	1.660	0.861	0.685
Accomplishments/Planned Programs Subtotals	7.005	4.175	6.204

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305186D8Z / *Policy R&D Programs*	Project (Number/Name) 186 / *Policy R&D Programs*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Future Security Challenges	MIPR	Various : Various	14.614	5.345	Jun 2015	3.307	Jul 2016	5.344	May 2017	-		5.344	-	-	-
		Subtotal	14.614	5.345		3.307		5.344		-		5.344	-	-	-

Remarks

Analytical effort charted to provide DoD senior leadership with an understanding of key long-term developments and dynamics in specific areas of the global security environment, and to develop competitive strategies for the consideration as the Department seeks to address these long term challenges.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Defense Planning Scenarios Activities	MIPR	Various : Various	0.850	1.660	Jul 2015	0.868	Jun 2016	0.860	Jul 2017	-		0.860	-	-	-
		Subtotal	0.850	1.660		0.868		0.860		-		0.860	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.464	7.005		4.175		6.204		-		6.204	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305186D8Z / *Policy R&D Programs*	**Project (Number/Name)** 186 / *Policy R&D Programs*

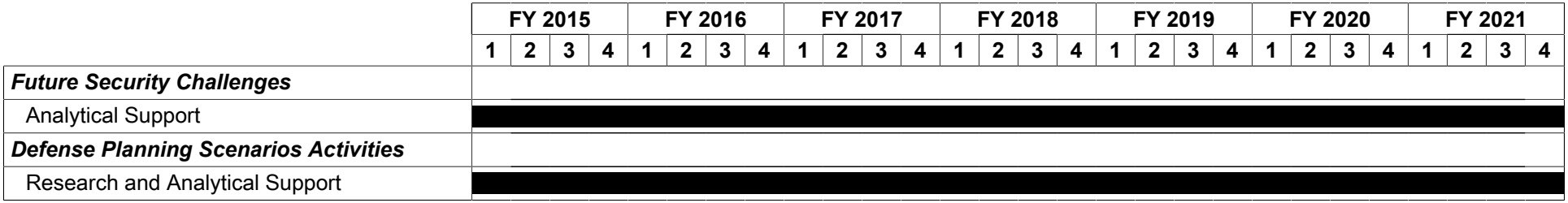

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305186D8Z / *Policy R&D Programs*	**Project (Number/Name)** 186 / *Policy R&D Programs*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Future Security Challenges				
Analytical Support	1	2015	4	2021
Defense Planning Scenarios Activities				
Research and Analytical Support	1	2015	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305199D8Z / *Net Centricity*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	16.005	23.229	18.095	17.971	-	17.971	19.419	20.624	20.888	21.292	Continuing	Continuing
199: *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*	16.005	23.229	18.095	17.971	-	17.971	19.419	20.624	20.888	21.292	Continuing	Continuing

A. Mission Description and Budget Item Justification

Funds will be used to provide technical analysis, systems engineering and capability management oversight of programs, projects, initiatives and activities to maximize the Department's return on investment in information technology resources and affect a comprehensive approach for assessing and procuring critical information systems from initial design, through development to capability delivery in support of improved systems performance and military operations. Emphasis is placed on the information transport, information assurance/cyber security, network and spectrum management, command and control (C2) applications, systems and services, information sharing capabilities, commercial mobile devices (CMD), applications and infrastructure, and enterprise services activities focused on the development, integration, testing and technical assessment of capabilities and applications in joint and coalition warfighter support environments. Resources support collaborative efforts to demonstrate the interoperability and performance requirements of command, control, communication, computing network, and Information Infrastructure (C4II) capabilities and programs. This program is funded under Budget Activity 7, Operational System Development.

This project provides the resources necessary to implement net centric processes and authoritative analytic methods that provide the capability to synchronize interdependent C4II capabilities across all layers (ground, air, space, maritime, cyberspace) of the joint information environment (JIE), to forecast and achieve a balance in supply and demand for network capacity, and field effective capabilities more rapidly and efficiently as an enabler for C4II capabilities applications and services. Resources are required to transform current networks and information infrastructure into an operationally unified and architecturally diverse and secure joint information environment that will provide end-to-end communications transport layer, computing networks, and mission application capabilities that are optimized and integrated with all other joint capability areas with a focus on the tactical edge faced with disconnected, intermittent, and latency (DIL) environments. There will be technical assessments, modeling and simulation, and analysis of the Joint space communications layer, Joint aerial network layer, contested communications on the move, Position Navigation and Timing (PNT), C2 mission applications, commercial mobile devices, and information sharing capabilities. These funds provide the capability for the warfighter to manage and deconflict radio frequencies through ground, air, and space communication networks. The funds will be used to develop and synchronize information assurance capabilities with other joint information environment capabilities to provide secure access to information and services (e.g. Cryptographic Modernization Management plan).

In addition, funding will continue to be used to support the Defense Information System's Agency's (DISA) and Services' interoperable improvement efforts and processes in the development of common standards and protocols. This effort includes initiating the Joint Interoperability Enhancement Process (IEP) that allows operators, engineers, and program managers to verify capabilities and identify issues in a design with Joint /Allied units prior to system fielding, or with fielded systems to identify required systems changes for systems upgrade planning. DISA and the Joint Forces Combatant Command lead the effort to transform the current standards and interoperability management tools to a common set of Joint network-enabled standards to ensure adherence to the DoD Information Network (DODIN) enterprise-wide technical baseline and for implementation of future Tactical Data Link (TDL) capabilities. These joint standards, protocols, and processes will be used for

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305199D8Z / *Net Centricity*

implementation and testing to ensure the TDL capabilities are synchronized with the development and integration timelines of other planned network-enabled DODIN initiatives. The threats to the networking waveforms and the Joint NC migration will also be looked at in cooperation with the Intelligence agencies.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	23.950	18.130	18.518	-	18.518
Current President's Budget	23.229	18.095	17.971	-	17.971
Total Adjustments	-0.721	-0.035	-0.547	-	-0.547
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.712	-			
• Program Adjustments	-0.009	-	-0.062	-	-0.062
• FFRDC Reduction	-	-0.035	-	-	-
• Efficiency Reduction	-	-	-0.366	-	-0.366
• Economic Assumptions	-	-	-0.119	-	-0.119

Change Summary Explanation

FY 2015: SBIR/STTR adjustment -0.712 million, Program Adjustment -0.009 million.

FY 2016: FFRDC Reduction -0.035 million.

FY 2017: Efficiency Adjustment -0.366 million, Economic Assumptions -0.119 million, Program Adjustment -0.062 million.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / *Net Centricity*	Project (Number/Name) 199 / *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
199: *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*	16.005	23.229	18.095	17.971	-	17.971	19.419	20.624	20.888	21.292	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds will be used to provide technical analysis, systems engineering and capability management oversight of programs, projects, initiatives and activities to maximize the Department's return on investment in information technology resources and affect a comprehensive approach for assessing and procuring critical information systems from initial design, through development to capability delivery in support of improved systems performance and military operations. Emphasis is placed on the information transport, information assurance, network and spectrum management, command and control (C2) applications, systems and services, information sharing capabilities, and enterprise services activities focused on the development, integration, testing and technical assessment of capabilities and applications in joint and coalition warfighter support environments. Resources support collaborative efforts to demonstrate the interoperability and performance requirements of command, control, communication, computing network, and Information Infrastructure (C4II) capabilities and programs. This program is funded under Budget Activity 7, Operational System Development.

This project provides the resources necessary to implement net centric processes and authoritative analytic methods that provide the capability to synchronize interdependent C4II capabilities across all layers (ground, air, space) of the joint information environment architecture, to forecast and achieve a balance in supply and demand for network capacity, and field effective capabilities more rapidly and efficiently as an enabler for C4&II capabilities applications and services. Resources are required to transform current networks and information infrastructure into an operationally unified and architecturally diverse joint information environment that will provide end-to-end communications transport layer, computing networks, and mission application capabilities that are optimized and integrated with all other joint capability areas with a focus on the tactical edge faced with disconnected, intermittent, and latency (DIL) environments. There will be technical assessments, modeling and simulation, and analysis of the Joint space communications layer, Joint aerial network layer, contested communications on the move, Position Navigation and Timing (PNT), C2 mission application, and information sharing capabilities. These funds provide the capability for the warfighter to manage and deconflict radio frequencies through ground, air, and space communication networks. The funds will be used to develop and synchronize information assurance capabilities with other joint information environment capabilities to provide secure access to information and services (e.g. Cryptographic Modernization Management plan).

In addition, funding will continue to be used to support the Defense Information System's Agency's (DISA) and Services' interoperable improvement efforts and processes in the development of common standards and protocols. This effort includes initiating the Joint Interoperability Enhancement Process (IEP) that allows operators, engineers, and program managers to verify capabilities and identify issues in a design with Joint /Allied units prior to system fielding, or with fielded systems to identify required systems changes for systems upgrade planning. DISA and the Joint Forces Combatant Command lead the effort to transform the current standards and interoperability management tools to a common set of Joint network-enabled standards to ensure adherence to the Global Information Grid (GIG) enterprise-wide

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technical baseline and for implementation of future Tactical Data Link (TDL) capabilities. These joint standards, protocols, and processes will be used for implementation and testing to ensure the TDL capabilities are synchronized with the development and integration timelines of other planned network-enabled Global Information Grid (GIG) initiatives. The threats to the networking waveforms and the Joint NC migration will also be looked at in cooperation with the Intelligence agencies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Net Centricity Plans and Accomplishments	23.229	18.095	17.971
FY 2015 Accomplishments: $5.000 million supports classified program, Details can be provided at a higher classification under separate cover. $18.229 million supported: – Conducted technical assessment/refined commercial wireless policy guidance to support CMD strategy implementation; continued assessments of the effects of cybersecurity policies. – Refined CMD certification processes, Mobile Application Management (MAM)/Mobile Device Management (MDM) guidance, and guidance for personal user based enforcement; updated approved product matrix for CMD. – Conducted implementation assessments to refine strategies for mobile applications and devices – Updated Mobile Application Approval process guide, DoD Mobile PKI guide, and procedure for the Electronic Flight Bag (EFB). – Provided technical and business case analyses for Commercial mobile devices and voice encryption. – Completed version 2 of the Radio and Communication Security modernization plan for tactical radios. Assessed Service implementation. – Conducted analysis and updated the CJTF Architecture to reflect Component C4II capability plans, include locations and connectivity of Tactical Processing Node (TPN) to support JIE at the tactical edge. – Continued development of interoperable Land Mobile Radio (LMR) standards to support public safety communications. – Conducted analysis to update LMR policy to refine procedures for LMR implementation in the DoD. – Conducted analysis and refined procedures for Waveform Development and Management in the DoD. – Evolved the Waveform Policy Implementation Guide to ensure an authoritative list of DoD-approved waveforms, with a process and supporting repository to solicit waveform applications and maintain the approved waveform baseline. – Provided technical analysis on methods for securing ISR data over wireless platforms and extended encryption of these devices, conduct implementation assessments through UAS encryption data calls. – Provided technical analysis and support for Protected, Wideband, Narrowband, and Commercial SATCOM. Developed an initial strategy and policy guidance to optimize SATCOM capabilities. – Updated SATCOM Synchronization Architectures for Protected, Wideband, Narrowband and Commercial SATCOM capabilities. Continued efforts to integrate SATCOM Sync Architectures into overall DoD CIO assessment processes. – Conducted compliance reviews of select programs; identify shortfalls in program bandwidth supportability planning and analysis and provided recommendations for corrective action. Submitted annual Bandwidth report to Congress as required by NDAA.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Completed SATCOM Gateway Right-sizing Study and developed implementation approaches to optimize SATCOM gateways across the defense enterprise. Provided technical analysis to support PACOM gateway implementation. – Continued technical and requirements analysis to determine way ahead for future Narrowband SATCOM capabilities. Continued feasibility assessments for implementing legacy narrowband solutions for MUOS payload. – Conducted business case analysis to determine alternative approaches to implement JIPM capabilities. – Provided technical analysis to assess options in support of the Protected SATCOM AoA. – Continued technical analysis to implement approaches to improve DoD utilization of Commercial SATCOM capabilities. – Conducted a capability based assessment (CBA) to identify and assess Airborne ISR (AISR) transport capability requirements and gaps. Updated AISR transport reference architecture artifacts to support assessments. – Continued technical analysis of Coalition C2 and MNIS, analyze Coalition C2 functional requirements, strategic policy development and capability strategies to guide Mission Partner Environment (MPE) development. – Conducted technical analysis of selected joint and Service C2 programs/initiatives to promote enterprise approaches for data and services consistent with joint C2 sustainment and modernization plans. – Provided technical analysis for the implementation of Common Mission Network Transport (CMNT) capability. – Provided technical analysis of MNIS programs and initiatives, related acquisition strategies, and functional requirements; continued development of C2 information sharing mechanisms consistent with capability strategies. – Conducted analysis to refine the joint C2 technical and architectural artifacts and informed transition of GCCS Family of Systems to a network enabled applications and services rationalized for the JIE. – Provided studies and analysis of the C2 capability gaps to inform investment strategies, enable investment tracking, and POM development – Conducted analyses to address adoption and evolution of C2 mission services as candidate enterprise services for the JIE. – Continued analysis of requirements, capability gaps and integrated priority lists of all joint requirements for C4II capabilities to support DoD CIO engagement in the C4/Cyber Functional Capability Board. – Continued wireless architecture and advanced technologies analysis to inform implementation of mobility solutions. – Conducted technical analysis to support compliance oversight of waveform policies and technical profile specifications. – Developed updates to Department-wide communications policy guidance applicable to commercial mobile devices. – Continued DoD Commercial Mobility implementation and systems engineering analysis Defense Mobile Unclassified and Classified Capabilities (DMUC/DMCC). – Conducted analysis to support DMUC derived credentials implementation. – Continued analysis of LTE technology for DoD tactical use. – Continued technical analysis for Network Management (NM) interoperability, architecture and data artifacts. – Continued systems engineering and architecture analysis for JIE tactical processing nodes (TPNs). Conducted technical analysis of tactical cloud computing approaches as a means to enhance TPN solutions.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continued analysis to address Tactical Secure Voice Communications Interoperability Specification (TSVSIC) implementation. – Continued efforts to determine strengths, weaknesses, and uses of waveforms and network management capabilities; identified gaps; assessed new technologies in support of waveform and network management efforts. – Conducted technical analysis/developed GTPs and Reference Implementations in support of network management strategy and roadmap. – Continued development of data ontologies and NIEM compliant IEPDs for network management. – Conducted technical analysis in support of C4II policies, plans, studies, roadmaps, and capability assessments. – Continued end-to-end analysis of the SATCOM environment; supported evaluations and analysis of end-to-end capabilities. – Conducted studies and develop analytical papers in support of the DoD CIO's Mobile Device Strategy and Mobile Device Security Efforts – Continued technical analysis/studies related to the migration of current applications and services to DoD Core Data Centers and supported rationalization of applications for the JIE. – Provided technical analysis to support the Joint Technology Synchronization Office (JTSO) Integrated Design Team (IDT) efforts related to implementation of JIE capability upgrades and technical planning. – Conducted studies and analysis to finalize metrics and assessed progress of JIE technical implementation actions. – Conducted technical analysis and studies related to Software Defined Networking (SDN) as an approach to network normalization. – Concluded follow-on JALN analysis with Joint Service JALN Council to oversee Service implementation efforts. – Continued efforts to establish the foundation for Interoperability Enhancement Process (IEP) for Joint capabilities with DISA/J6 Enterprise Toolset and Data Base. – Conducted technical and policy assessments to enable Tactical Data Link (TDL) migration. – Continued Joint Common Data Link (CDL) documentation of official waveform in support of Joint interoperability. – Supported Allied and Coalition interoperability efforts including NATO migration plan, JSF partner interoperability, US/Swedish MIEA, and integration of US and foreign communications and C2 systems – Conducted analysis to support Joint TDL migration policy. – Analyzed available Gateway architecture alternatives to support inter-platform connectivity and reach back. – Refined gateway right sizing options; proposed RF terminal solutions and baseband equipment suites including the number/ types of equipment needed to meet the future warfighter needs. Coordinated and facilitated Teleport Program Office oversight initiatives. – Conducted analysis to evolve SATCOM networks toward an EOIP modem architecture. Continued support of video dissemination and two-way GBS capabilities to inform follow on implementation across the Department. – Conducted analysis for the SATCOM International Standards Committee. Supported development of US lead Standardized Agreements (STANAGS) and provided a technical review of other nation's STANAG's for accuracy, completeness, and feasibility.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Conducted analysis to inform acquisition strategy for U.S. support to NATO SATCOM post 2019. – Provided technical analysis and facilitated execution of the SATCOM Systems Engineering Group (SSEG). – Conducted technical analysis to evolve the approach for Defense Information Systems Network (DISN) technology refresh plans for CIO approval. – Supported DISN Quarterly reviews to assess progress and issues in transport and network infrastructure, unified capabilities and network management in support of JIE priorities. – Conducted analysis to maintain and expand the JIE single security architecture through analysis and implementation of the Joint Regional Security Stacks (JRSS) and associated cyber security capabilities. – Continued efforts to maintain JIE Infrastructure Framework and synchronization roadmap to track infrastructure deployment or implementation – Revised acquisition like review of JIE objectives, plans, technical approaches, schedules and cost factors to support technical reviews. – Supported the development of business case activities as required to support investment decisions for C4II capabilities. – Conducted analysis to address a need to formalize the process of release of waveforms to foreign governments, as identified by the Arms Transfer and Technology Release Senior Steering Group (ATTR SSG). – Analyzed interoperable, secure, and affordable waveforms and wireless communications in support of Service, Multi-Service and Coalition forces – Participated in process to recommend standards conduct compliance and certification assessments in accordance with DoD policies, and reviewed content of a DoD Waveform Information Repository (IR). – Analyzed TSVCIS to determine if it meets COMSEC modernization compliance guidance and CJCSI 6510 requirements. – Provided technical analysis of SATURN ability to provide improved anti-jam communications and support Multi-Partner communications needs. – Determined which version of the TSVCIS and SATURN standards are the starting points for acquisition programs. – Conducted trade studies to determine if the TSVCIS and SATURN can be integrated easily and are cost effective.			
FY 2016 Plans: – Continue technical assessment/refine commercial wireless policy guidance to support CMD strategy implementation; continue assessments of the effects of cybersecurity policies. – Continue to refine CMD certification processes, Mobile Application Management (MAM)/Mobile Device Management (MDM) guidelines, and guidelines for personal user based enforcement; update approved product matrix for CMD. – Continue implementation assessments to refine mobile application and device strategies. – Review/refine mobile application approval process guides, DoD Mobile PKI guides, and procedure for the Electronic Flight Bag (EFB)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue technical and business case analyses for Commercial mobile devices and voice encryption. – Completed version 3 of the Radio and Communication Security modernization plan for tactical radios. Assess Service implementation focusing on Service investment areas to support modernization and crypto compliance goals. – Continue analysis to update the CJTF Architecture to reflect Component C4II capability plans integrate the Radio and COMSEC Plan's inventory to reflect the enterprise communications capability of the CJTF Architecture that will support JIE TPNs. – Continue development of interoperable Land Mobile Radio (LMR) standards to support public safety communications and FirstNet. – Continue analysis to of LMR policy implementation; refine procedures to support LMR implementation in the DoD. – Continue analysis of Waveform Development and Management in the DoD to support enhanced re-use and portability of waveforms supporting Service and Coalition communications needs. – Continue analysis to maintain authoritative list of DoD-approved waveforms and supporting repository to maintain waveform baseline. – Continue technical analysis on methods for securing ISR data over wireless platforms and extended encryption of these devices, conduct implementation assessments through UAS encryption data calls. – Continue technical analysis and support for Protected, Wideband, Narrowband, and Commercial SATCOM. Assess strategy alignment. – Update SATCOM Synchronization Architectures for Protected, Wideband, Narrowband and Commercial SATCOM capabilities. – Continue compliance reviews of select programs; identify shortfalls in program bandwidth supportability planning and analysis and provide recommendations for corrective action. – Continue efforts to implement SATCOM Gateway Right-sizing approaches to optimize SATCOM gateways across the defense enterprise. – Continue technical/requirements analysis and feasibility assessments for implementing legacy narrowband solutions for MUOS payload. – Continue analysis to support implementation approaches for JIPM alternatives. – Conduct follow-on analysis in support of the Protected SATCOM AoA recommendations and preferred alternative. – Continue technical analysis to improve DoD utilization of Commercial SATCOM capabilities.. – Conduct Airborne ISR (AISR) transport analysis of alternatives based on Capability Based Analysis (CBA) results. Support development of AISR Transport ICD to document enterprise wide requirements. Update AISR transport reference architecture and requirements documents to support implementation. – Continue technical analysis of Coalition C2 and MNIS, analyze Coalition C2 functional requirements, strategic policy development and capability strategies to guide Mission Partner Environment (MPE) development. – Continue technical analysis of selected joint and Service C2 programs/initiatives to promote enterprise approaches for data and services consistent with JIE objectives.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue technical analysis for the implementation of Common Mission Network Transport (CMNT) capability. – Continue technical analysis of MNIS programs and initiatives, related acquisition strategies, and functional requirements. – Continue analysis to refine the joint C2 technical and architectural artifacts and inform an evaluation of alternatives for the GCCS Family of Systems. – Conduct analysis of capability needs to enable command and control across the JIE. Evaluate Enterprise Operations Center architectures, and information requirements to support investment decisions in JIE C2 capabilities. – Continue analyses to address adoption and evolution of mission services as candidate enterprise services for the JIE. – Continue analysis of requirements, capability gaps and integrated priority lists of all joint requirements for C4II capabilities to support DoD CIO engagement in the C4/Cyber Functional Capability Board. – Continue wireless architecture and advanced technologies analysis to inform Department-wide policies and implementation of mobility solutions. – Continue technical analysis to support compliance oversight of waveform policies and technical profile specifications. – Continue efforts to refine communications policies and analysis technologies applicable to commercial mobile devices. – Continue DoD Commercial Mobility implementation and systems engineering analysis Defense Mobile Unclassified and Classified Capabilities (DMUC/DMCC). – Continue analysis to support DMUC derived credentials implementation. – Continue analysis of LTE technology for DoD tactical use. – Continue technical analysis for Network Management (NM) interoperability, architecture and data artifacts. – Continue systems engineering and architecture analysis for JIE tactical processing nodes (TPNs). Continue technical analysis of tactical cloud computing approaches as a means to enhance TPN solutions. – Continue analysis to address implementation of TSVSIC for tactical radios. – Continue efforts to determine strengths, weaknesses, and uses of waveforms and network management capabilities; identified gaps; assesse new technologies in support of waveform and network management efforts. – Continue technical analysis to support implementation of the network management strategy and roadmap. – Continue development of data ontologies and NIEM compliant IEPDs for network management. – Continue technical analysis in support of C4II policies, plans, studies, roadmaps, and capability assessments. – Continue end-to-end analysis of the SATCOM environment; support technical evaluations of end-to-end capabilities. – Continue studies and analysis in support of the DoD CIO's Mobile Device Strategy and Mobile Device Security Efforts. – Continue technical analysis/studies related to the migration of current applications and services to DoD Core Data Centers and support rationalization of applications for the JIE. – Continue technical analysis to support implementation of JIE capability upgrades and technical planning. – Continue studies and analysis to progress of JIE technical implementation actions. – Continue technical analysis and studies related to SDN as an approach to network normalization and security.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue follow-on JALN analysis with Joint Service JALN Council, overseeing Service implementation efforts. – Conduct Joint IEP analysis for Link 16 and work on adding Variable Message Format (VMF), Link 11/22, Multifunction Advanced Data Link (MADL), and Common Data Link (CDL) through the FYDP. – Continue technical and policy assessments to enable TDL migration. – Continue efforts to finalize Joint MIL-SPEC for CDL and initiate documentation for MADL in coordination with JSF team. – Continue support for Allied and Coalition interoperability efforts including NATO migration plan, JSF partner interoperability, US/ Swedish MIEA, and integration of US and foreign communications and C2 systems. – Analyze available Gateway technology alternatives to address joint aerial layer networking capabilities in the evolving threat environment with both physical (e.g. jamming) and cyber-attacks. – Assess developing waveform technologies for improving the robustness and scalability of current TDL networks Continue efforts to refine gateway right sizing options, propose RF terminal solutions and baseband equipment suites including the number and types of equipment needed to meet the future needs of the war fighter. Coordinate and facilitate Teleport Program Office oversight initiatives. – Continue analysis to evolve SATCOM networks toward EOIP modem architecture. Continue support of video dissemination and two-way GBS capabilities to inform follow on implementation across the Department. – Continue analysis for the SATCOM International Standards Committee (SISC). Participate in the development of US lead Standardized Agreements (STANAGS) and provide a technical review of other nation's STANAG's for accuracy, completeness, and feasibility. – Continue efforts to develop acquisition strategy for U.S. support to NATO SATCOM post 2019 – Continue technical analysis and facilitate execution of the SATCOM Systems Engineering Group (SSEG) – Continue efforts to review, assess, and process DISN Tech Refresh plans for CIO approval. – Coordinate, facilitate and record DISN reviews to assessed progress and issues in transport and network infrastructure, unified capabilities and network management. – Continue efforts to maintain JIE Infrastructure Framework and synchronization roadmap to track infrastructure deployment or implementation. – Continue to maintain and expand the JIE single security architecture through analysis and implementation of the Joint Regional Security Stacks (JRSS) and associated cyber capabilities. – Continue acquisition like review of JIE objectives, plans, technical approaches, schedules and cost factors to support technical reviews of JIE implementation. – Support the development of business case activities as required. – Continue analysis of release of waveforms to foreign governments, as identified by the Arms Transfer and Technology Release Senior Steering Group (ATTR SSG).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue to analyze interoperable, secure, and affordable waveforms and wireless communications in support of Service, Multi-Service and Coalition forces. – Continue analysis process and recommend standards conduct compliance and certification assessments in accordance with DoD policies, and reviewed content of a DoD Waveform Information Repository (IR). – Analyzed TSVCIS implementation and COMSEC modernization compliance guidance and CJCSI 6510 requirements. – Provided technical analysis of SATURN ability to provide improved anti-jam communications and support Multi-Partner communications needs. – Determined which edition of TSVCIS and SATURN standards are integrated into radio acquisition programs. – Conducted trade studies to determine if they TSVCIS and SATURN can be integrated easily and are cost effective. – Conduct Network capabilities review (NCR) an effort to examine the capabilities programmed in POM 17-21 in the Mission Command portfolio to look for alternate strategies for a more efficient set of capabilities. – Conduct analysis in coordination with the Director, National Security Agency/Chief, Central Security Service (DIRNSA/CHCSS), advance the state of the art in assurance tools, techniques, and methods for creating and identifying non-cryptologic software and hardware that is free from exploitable vulnerabilities and malicious intent for tactical communications.			
FY 2017 Plans: – Continue technical assessment/refine commercial wireless policy guidance to support CMD strategy implementation; continue assessments of the effects of cybersecurity policies. – Continue to refine CMD certification processes, Mobile Application Management (MAM)/Mobile Device Management (MDM) guidelines, and guidelines for personal user based enforcement; update approved product matrix for CMD. – Continue implementation assessments to refine mobile application and device strategies. – Review/refine mobile application approval process guides, DoD Mobile PKI guides, and procedure for the Electronic Flight Bag (EFB). – Continue technical and business case analyses for Commercial mobile devices and voice encryption. – Update the Radio and Communication Security modernization plan for tactical radios. Assess Service implementation. – Continue analysis to update the CJTF Architecture to reflect Component C4II capability plans. – Continue development of interoperable Land Mobile Radio (LMR) standards to support public safety communications. – Continue analysis to of LMR policy implementation; refine procedures to support LMR implementation in the DoD. – Continue analysis of Waveform Development and Management in the DoD. – Continue analysis to maintain authoritative list of DoD-approved waveforms and supporting repository to maintain waveform baseline. – Continue technical analysis on methods for securing ISR data over wireless platforms and extended encryption of these devices, conduct implementation assessments through UAS encryption data calls.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue technical analysis and support for Protected, Wideband, Narrowband, and Commercial SATCOM. Assess strategy alignment. – Update SATCOM Synchronization Architectures for Protected, Wideband, Narrowband and Commercial SATCOM capabilities. – Continue compliance reviews of select programs; identify shortfalls in program bandwidth supportability planning and analysis and provide recommendations for corrective action. – Continue efforts to implement SATCOM Gateway Right-sizing approaches to optimize SATCOM gateways across the defense enterprise. – Continue technical/requirements analysis and feasibility assessments for implementing legacy narrowband solutions for MUOS payload. – Continue analysis to support implementation approaches for JIPM alternatives. – Conduct follow-on analysis in support of the Protected SATCOM AoA recommendations and preferred alternative. – Continue technical analysis to improve DoD utilization of Commercial SATCOM capabilities. – Conduct Airborne ISR (AISR) transport analysis of alternatives follow on analysis based on AoA recommendations and preferred alternatives. Update AISR transport reference and solution architecture artifacts to support implementation. – Continue technical analysis of Coalition C2 and MNIS, analyze Coalition C2 functional requirements, strategic policy development and capability strategies to guide Mission Partner Environment (MPE) development. – Continue technical analysis of selected joint and Service C2 programs/initiatives to promote enterprise approaches for data and services. – Continue technical analysis for the implementation of Common Mission Network Transport (CMNT) capability. – Continue technical analysis of MNIS programs and initiatives, related acquisition strategies, and functional requirements. – Continue analyses to address adoption and evolution of mission services as candidate enterprise services for the JIE. – Conduct follow-on analysis to inform implementation of the EoA recommendations for the GCCS Family of Systems. – Continue analysis of capability needs to enable command and control across the JIE. Evaluate Enterprise Operations Center architectures, and information requirements to support investment decisions in JIE C2 capabilities. – Continue analysis of requirements, capability gaps and integrated priority lists of all joint requirements for C4II capabilities to support DoD CIO engagement in the C4/Cyber Functional Capability Board. – Continue wireless architecture and advanced technologies analysis to inform Department-wide policies and implementation of mobility solutions. – Continue technical analysis to support compliance oversight of waveform policies and technical profile specifications. – Continue efforts to refine communications policies and analysis technologies applicable to commercial mobile devices. – Continue DoD Commercial Mobility implementation and systems engineering analysis Defense Mobile Unclassified and Classified Capabilities (DMUC/DMCC). – Continue analysis to support DMUC derived credentials implementation.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue analysis of LTE technology for DoD tactical use. – Continue technical analysis for Network Management (NM) interoperability, architecture and data artifacts. – Continue systems engineering and architecture analysis for JIE tactical processing nodes (TPNs). – Continue analysis to address implementation of TSVSIC for tactical radios. – Continue efforts to determine strengths, weaknesses, and uses of waveforms and network management capabilities; identified gaps; assesse new technologies in support of waveform and network management efforts. – Continue technical analysis to support implementation of the network management strategy and roadmap. – Continue development of data ontologies and NIEM compliant IEPDs for network management. – Continue technical analysis in support of C4II policies, plans, studies, roadmaps, and capability assessments. – Continue end-to-end analysis of the SATCOM environment; support technical evaluations of end-to-end capabilities. – Continue studies and analysis in support of the DoD CIO's Mobile Device Strategy and Mobile Device Security Efforts. – Continue technical analysis/studies related to the migration of current applications and services to DoD Core Data Centers and support rationalization of applications for the JIE. – Continue technical analysis to support implementation of JIE capability upgrades and technical planning. – Continue studies and analysis to progress of JIE technical implementation actions. – Continue technical analysis and studies related to SDN as an approach to network normalization and security. – Continue Joint IEP analysis for Link 16 and work on adding Variable Message Format (VMF), Link 11/22, Multifunction Advanced Data Link (MADL), and Common Data Link (CDL) through the FYDP. – Continue technical and policy assessments to enable TDL migration. – Continue efforts to finalize Joint MIL-SPEC for CDL and initiate documentation for MADL in coordination with JSF team. – Continue support for Allied and Coalition interoperability efforts including NATO migration plan, JSF partner interoperability, US/Swedish MIEA, and integration of US and foreign communications and C2 systems. – Assess developing waveform technologies for improving the robustness and scalability of current TDL networks. – Continue efforts to refine and implement gateway right sizing options; evaluate RF terminal solutions and baseband equipment suites including the number and types of equipment needed to meet the future needs of the war fighter. Coordinate and facilitate Teleport Program Office oversight initiatives. – Continue analysis to evolve SATCOM networks toward EOIP modem architecture. Continue support of video dissemination and two-way GBS capabilities to inform follow on implementation across the Department. – Continue analysis for the SATCOM International Standards Committee (SISC). Participate in the development of US lead Standardized Agreements (STANAGS) and provide a technical review of other nation's STANAG's for accuracy, completeness, and feasibility. – Continue efforts to evaluate and implement acquisition strategies for U.S. support to NATO SATCOM post 2019. – Continue technical analysis and facilitate execution of the SATCOM Systems Engineering Group (SSEG).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
– Continue efforts to review, assess, and process DISN Tech Refresh plans for CIO approval. – Coordinate, facilitate, and record DISN Quarterly reviews to assessed progress and issues in transport and network infrastructure, unified capabilities and network management. – Continue efforts to maintain JIE Infrastructure Framework and synchronization roadmap to track infrastructure deployment or implementation. – Continue acquisition like review of JIE objectives, plans, technical approaches, schedules and cost factors to support technical reviews of JIE implementation. – Support the development of business case activities as required. – Develop guidance (e.g., information system security engineering guidance) and programming recommendations to ensure the integration of Trusted Systems Networks concepts and processes into the acquisition and maintenance of DoD information systems, enclaves, and services, including the purchase and integration of tactical communication commodities.			
Accomplishments/Planned Programs Subtotals	23.229	18.095	17.971

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

– PPBE related issue development and approval
– Successful technical development and analysis of the CIO and DCIO C4IIC portfolio of programs and activities
– Develop comprehensive risk assessment and mitigation approaches of the CIO and DCIO C4IIC portfolio of programs and activities

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / *Net Centricity*	Project (Number/Name) 199 / *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Studies and Analysis	Various	Various : Various	1.149	1.010	Jul 2015	0.967	Jul 2016	0.992	Jul 2017	-		0.992	Continuing	Continuing	Continuing
Technical Engineering Services	Various	Various : Various	8.732	16.089	Jul 2015	11.293	Jul 2016	10.958	Jul 2017	-		10.958	Continuing	Continuing	Continuing
		Subtotal	9.881	17.099		12.260		11.950		-		11.950	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	3.514	3.967	Jul 2015	3.799	Jul 2016	3.897	Jul 2017	-		3.897	Continuing	Continuing	Continuing
Program Support	FFRDC	Various : Various	0.100	0.088	Jul 2015	0.084	Jul 2016	0.086	Jul 2017	-		0.086	Continuing	Continuing	Continuing
Engineering Support	FFRDC	Various : Various	0.200	0.176	Jul 2015	0.134	Jul 2016	0.173	Jul 2017	-		0.173	Continuing	Continuing	Continuing
R&D Support	Various	Various : Various	2.310	1.899	Jul 2015	1.818	Jul 2016	1.865	Jul 2017	-		1.865	Continuing	Continuing	Continuing
		Subtotal	6.124	6.130		5.835		6.021		-		6.021	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.005	23.229		18.095		17.971		-		17.971	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305199D8Z / *Net Centricity*	**Project (Number/Name)** 199 / *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*

R4

PE 0305199D8Z/ Net Centricity

SATCOM, JIE, NC3 and Related Engineering Analysis

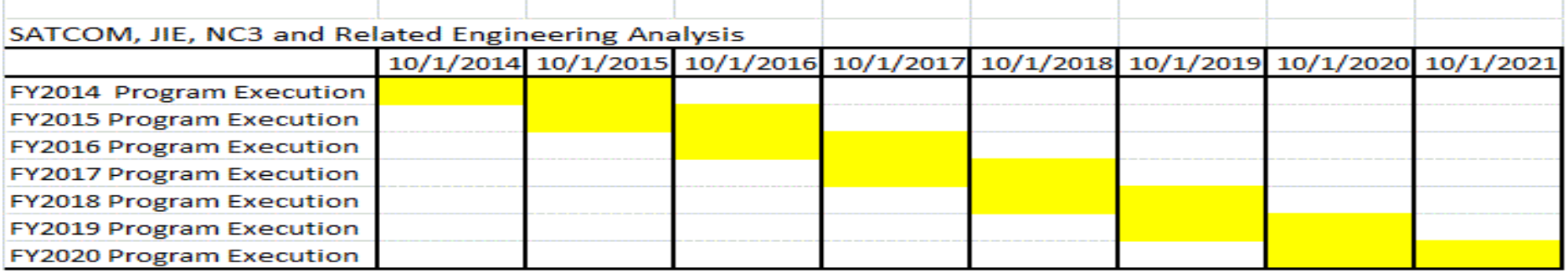

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305199D8Z / *Net Centricity*	**Project (Number/Name)** 199 / *GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY15 Project Execution	1	2015	4	2016
FY16 Project Execution	1	2016	1	2017
FY17 Project Execution	1	2017	1	2018
FY18 Project Execution	1	2018	1	2019
FY19 Project Execution	1	2019	1	2020
FY20 Project Execution	1	2020	1	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	7.096	2.088	2.116	2.037	-	2.037	2.103	2.246	2.277	2.327	Continuing	Continuing
387: *Homeland Defense Technology Transfer Program*	7.096	2.088	2.116	2.037	-	2.037	2.103	2.246	2.277	2.327	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In conjunction with Congressionally directed (Sec. 1401, P.L. 107-314) Homeland Defense Technology Transfer program, ensures a successful and balanced transfer of dual-use technology equipment and information to first responders without impeding military readiness. Accelerates dual-use tech transfer to first responders, increases effectiveness of equipment transfers to first responders, and transfers technology through a transitional effort that has dual utility to improve homeland security and enhance public safety without degrading military readiness. Meets the Congressional intent of Sec 1401, FY 2003 National Defense Authorization Act (P.L. 107-314).

A. Mission Description and Budget Item Justification

Continues Congressionally directed (Sec. 1401, P.L. 107-314) Technology Transfer Program to consolidate and coordinate various military endeavors that pass technology and equipment to first responders. Works with a variety of DoD activities, interagency partners, and first responder organizations to ensure that dual-use military technology is expedited into the commercial sector for use by law enforcement, fire, and emergency medical service personnel. Works with the Military Departments and Defense Logistics Agency to ensure that appropriate excess military equipment is made available to the first responder community on an expedited basis. Fulfills Congressional intent to help improve public safety and enhance public security.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	2.106	2.119	2.194	-	2.194
Current President's Budget	2.088	2.116	2.037	-	2.037
Total Adjustments	-0.018	-0.003	-0.157	-	-0.157
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-			
• SBIR/STTR Transfer	-0.017	-			
• Internal Adjustment	0.000	-0.003	-0.157	-	-0.157

Change Summary Explanation

FY 2017 adjustment made to support OUSD(P) higher priority program requirements and contract efficiencies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Homeland Defense Technology Transfer Program	2.088	2.116	2.037
Description: Provided outreach through coordination and cooperation with inter-agency partners to provide dual-use technology and equipment to first responders. Ensured DoD components conducted Technology Transfer programs that are appropriate for the respective component. Provided information to stakeholders on equipment and technology use and availability. ***FY 2015 Accomplishments:*** - Continue to implement efficiencies. - Use a consortium of subject matter experts/governance councils to prioritize technology transfer requirements and expedite DoD dual-use technologies. - Continue program outreach activities and prioritize outreach to reflect efficiencies. - Enhance and expedite excess equipment transfer capabilities from service level divestiture efforts and overseas contingency operations. - Significantly expanded support for the transfer of dual-use DoD technologies appropriate for use by first responders in order to improve public safety and enhance homeland security. ***FY 2016 Plans:*** - Continue to implement efficiencies. - Use a consortium of subject matter experts/governance councils to prioritize technology transfer requirements and expedite DoD dual-use technologies. - Continue program outreach activities and prioritize outreach to reflect efficiencies. - Enhance and expedite excess equipment transfer capabilities from service level divestiture efforts and overseas contingency operations. ***FY 2017 Plans:*** - Continue to implement efficiencies. - Use a consortium of subject matter experts/governance councils to prioritize technology transfer requirements and expedite DoD dual-use technologies. - Continue program outreach activities and prioritize outreach to reflect efficiencies. - Enhance and expedite excess equipment transfer capabilities from service level divestiture efforts and overseas contingency operations.			
Accomplishments/Planned Programs Subtotals	2.088	2.116	2.037

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

As stated.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*	**Project (Number/Name)** 387 / *Homeland Defense Technology Transfer Program*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Defense Logistics Agency Support	MIPR	DLA J/3 : Alexandria VA	1.481	0.496	May 2015	0.094	Dec 2015	1.000	May 2017	-		1.000	-	-	-
		Subtotal	1.481	0.496		0.094		1.000		-		1.000	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support to program for dual use technologies	MIPR	Various : DoD Agencies	5.615	1.592	Jun 2015	2.022	May 2016	1.037	Jun 2017	-		1.037	-	-	-
		Subtotal	5.615	1.592		2.022		1.037		-		1.037	-	-	-

Remarks

Consolidate and coordinate various Military endeavors

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.096	2.088		2.116		2.037		-		2.037	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*	**Project (Number/Name)** 387 / *Homeland Defense Technology Transfer Program*

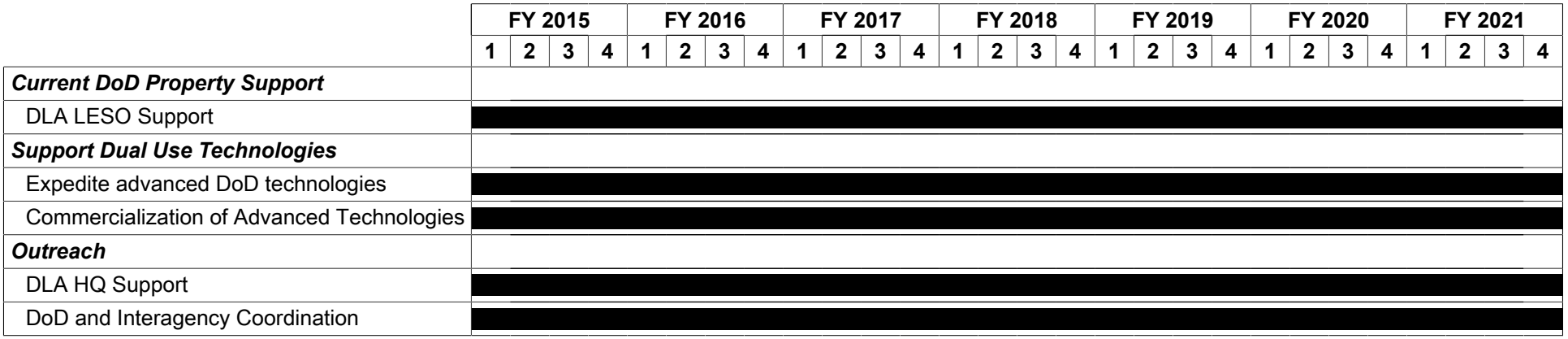

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0305387D8Z / *Homeland Defense Technology Transfer Program*	**Project (Number/Name)** 387 / *Homeland Defense Technology Transfer Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Current DoD Property Support				
DLA LESO Support	1	2015	4	2021
Support Dual Use Technologies				
Expedite advanced DoD technologies	1	2015	4	2021
Commercialization of Advanced Technologies	1	2015	4	2021
Outreach				
DLA HQ Support	1	2015	4	2021
DoD and Interagency Coordination	1	2015	4	2021

Exhibit R-5, RDT&E Termination Liability: PB 2017 Office of the Secretary Of Defense								Date: February 2016
Appropriation/Budget Activity 0400 / 7				R-1 Program Element (Number/Name) PE 0305387D8Z / *Homeland Defense Technology Transfer Program*				Project (Number/Name) 387 / *Homeland Defense Technology Transfer Program*

Cost ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Program Termination Liability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Office of the Secretary Of Defense	Date: February 2016
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0307577D8Z / *Intelligence Mission Data*

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	13.800	-	13.800	13.800	13.800	13.800	13.800	Continuing	Continuing
0307577D8Z: *Intelligence Mission Data*	-	0.000	0.000	13.800	-	13.800	13.800	13.800	13.800	13.800	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program serves as the single, overarching enterprise provisioning Intelligence Mission Data (IMD) for advanced weapons platforms, and addressing IMD-related issues across the Defense Acquisition System, Joint Capabilities integration and Development System, and the Planning, Programming, Budgeting, and Execution processes. Improving the identification of IMD requirements, production, acquisition strategy and risk assessments will be accomplished by the stand up of the Acquisition, Intelligence, Requirements Task Force (AIR TF) to implement enterprise-wide improvements in provisioning IMD for advanced weapons platforms. The AIR TF will recommend priorities to the Acquisition, Intelligence, Requirements Executive Steering Group (ESG) and oversee implementation of enterprise-wide integration of intelligence for advanced weapons platforms at the earliest possible point in the acquisition process. Additionally, IMD production and process improvements will enhance weapon system target identification and targeting priorities; guide resource allocation at the Service intelligence production centers; and provide surge production analysis and tool sets.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	13.800	-	13.800
Total Adjustments	0.000	0.000	13.800	-	13.800
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Department Adjustment	-	-	13.800	-	13.800

Change Summary Explanation

IMD is a new program stood up by the allocation of resources across multiple Service Intelligence Production Centers directed by the Acquisitions, Intelligence, Requirements Executive Steering Group.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0307577D8Z / *Intelligence Mission Data*	Project (Number/Name) 0307577D8Z / *Intelligence Mission Data*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
0307577D8Z: *Intelligence Mission Data*	-	0.000	0.000	13.800	-	13.800	13.800	13.800	13.800	13.800	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program serves as the single, overarching enterprise provisioning Intelligence Mission Data (IMD) for advanced weapons platforms, and addressing IMD-related issues across the Defense Acquisition System, Joint Capabilities integration and Development System, and the Planning, Programming, Budgeting, and Execution processes. Improving the identification of IMD requirements, production, acquisition strategy and risk assessments will be accomplished by the stand up of the Acquisition, Intelligence, Requirements Task Force (AIR TF) to implement enterprise-wide improvements in provisioning IMD for advanced weapons platforms. The AIR TF will recommend priorities to the Acquisition, Intelligence, Requirements Executive Steering Group (ESG) and oversee implementation of enterprise-wide integration of intelligence for advanced weapons platforms at the earliest possible point in the acquisition process. Additionally, IMD production and process improvements will enhance weapon system target identification and targeting priorities; guide resource allocation at the Service intelligence production centers; and provide surge production analysis and tool sets.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Intelligence Mission Data	0.000	0.000	13.800
Description: This program serves as the single, overarching enterprise provisioning Intelligence Mission Data (IMD) for advanced weapons platforms, and addressing IMD-related issues across the Defense Acquisition System, Joint Capabilities integration and Development System, and the Planning, Programming, Budgeting, and Execution process.			
FY 2015 Accomplishments: N/A			
FY 2016 Plans: N/A			
FY 2017 Plans: - Will establish the AIR TF and the Acquisition, Intelligence, Requirements ESG to implement enterprise-wide improvements in provisioning Intelligence Mission Data for advanced weapons platforms - Will enhance IMD production for F-15, F-22, EF-18G, and other weapons platforms' on-board mission data processors, in accordance with established Joint Staff identified priorities and risk criteria. - Will perform risk assessment modeling and simulation in order to determine prioritization of IMD production for the above weapons platforms.			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0307577D8Z / *Intelligence Mission Data*	**Project (Number/Name)** 0307577D8Z / *Intelligence Mission Data*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
- Will provide surge production analysis and tool sets in response to tactical needs in focused geographical regions.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	13.800

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• 0307577D8Z: *Intelligence Mission Data*	0.000	0.000	1.000	-	1.000	1.000	1.000	1.000	1.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition, management, and contracting strategy involves the following:
• Adhere to guidance outlined in the DoD 5000, Directive 7, Federal Acquisition Regulations (FAR), and FAR Supplement Policies and Procedures.
• Acquire and sustain IMD capabilities, systems, tools, products and services through a disciplined, yet agile, process that ensures information related capabilities are available for DoD components.
• Sustain an acquisition process that is responsive and responsible to internal and external customers and stakeholders.
• Support advanced weapons programs need for intelligence at the earliest point in the acquisition of the program.

E. Performance Metrics

The acquisition, management, and contracting strategy involves the following:
• Adhere to guidance outlined in the DoD 5000, Directive 7, Federal Acquisition Regulations (FAR), and FAR Supplement Policies and Procedures.
• Acquire and sustain IMD capabilities, systems, tools, products and services through a disciplined, yet agile, process that ensures information related capabilities are available for DoD components.
• Sustain an acquisition process that is responsive and responsible to internal and external customers and stakeholders.
• Support advanced weapons programs need for intelligence at the earliest point in the acquisition of the program.

E. Performance Metrics
RDTE performance metrics are used to assess the progress toward integrating intelligence mission data into the acquisition cycle. The following metrics focus on the return of investment of RDTE activities and assess the degree to meeting mission goals:
• Measure percent of funds that are used to improve advanced weapons platforms intelligence integration. Goal is 100%.
• Measure percent of advanced weapons systems platforms that have a complete IMD requirements and production baseline; could also measure percent of requirements funded.
• Measure the point in the acquisition timeline in which IMD requirements are identified and incorporated.
• Reduce the number of weapons programs without fully supported IMD requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0307577D8Z / *Intelligence Mission Data*	**Project (Number/Name)** 0307577D8Z / *Intelligence Mission Data*

• Reduce the timeline to incorporate IMD studies into weapons programs.
• Increase the ROI of studies performed.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Office of the Secretary Of Defense			Date: February 2016
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0307577D8Z / *Intelligence Mission Data*	Project (Number/Name) 0307577D8Z / *Intelligence Mission Data*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intelligence Mission Data	TBD	TBD : TBD	0.000	0.000		0.000		13.800		-		13.800	Continuing	Continuing	-
		Subtotal	0.000	0.000		0.000		13.800		-		13.800	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		13.800		-		13.800	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0307577D8Z / *Intelligence Mission Data*	**Project (Number/Name)** 0307577D8Z / *Intelligence Mission Data*

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
TBD																												

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Office of the Secretary Of Defense		Date: February 2016
Appropriation/Budget Activity 0400 / 7	**R-1 Program Element (Number/Name)** PE 0307577D8Z / *Intelligence Mission Data*	**Project (Number/Name)** 0307577D8Z / *Intelligence Mission Data*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
TBD	1	2017	4	2021

Note

No sub-projects established as of yet.

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