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**Department of Defense
Fiscal Year (FY) 2016 President's Budget Submission**

February 2015



Office of the Secretary Of Defense

Defense Wide Justification Book Volume 3 of 3

Research, Development, Test & Evaluation, Defense-Wide

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Department of Defense
 FY 2016 President's Budget
 Exhibit R-1 FY 2016 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

26 Jan 2015

Appropriation	FY 2014 (Base & OCO)	FY 2015 Base Enacted	FY 2015 OCO Enacted	FY 2015 Total Enacted	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Research, Development, Test & Eval, DW	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665
Total Research, Development, Test & Evaluation	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665

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Summary Recap of Budget Activities -----	FY 2014 (Base & OCO)	FY 2015 Base Enacted	FY 2015 OCO Enacted	FY 2015 Total Enacted	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Basic Research	118,431	137,317		137,317	117,309		117,309
Applied Research	116,041	133,871		133,871	141,155		141,155
Advanced Technology Development	806,190	802,960		802,960	1,075,906		1,075,906
Advanced Component Development And Prototypes	568,015	670,821		670,821	688,519		688,519
System Development And Demonstration	126,986	163,356		163,356	124,983		124,983
Management Support	605,078	638,878		638,878	480,928		480,928
Operational System Development	58,686	71,886		71,886	57,865		57,865
Total Research, Development, Test & Evaluation	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665
Summary Recap of FYDP Programs -----							
General Purpose Forces	5,161	1,952		1,952	1,946		1,946
Intelligence and Communications	109,213	113,232		113,232	90,500		90,500
Research and Development	2,245,867	2,464,955		2,464,955	2,550,408		2,550,408
Training Medical and Other	38,245	38,950		38,950	43,811		43,811
Administration and Associated Activities	941						
Total Research, Development, Test & Evaluation	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665

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Appropriation	FY 2014 (Base & OCO)	FY 2015 Base Enacted	FY 2015 OCO Enacted	FY 2015 Total Enacted	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Office of Secretary of Defense	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665
Total Research, Development, Test & Evaluation	2,399,427	2,619,089		2,619,089	2,686,665		2,686,665

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

Line No	Program Element Number	Item	Act	FY 2014 (Base & OCO)	FY 2015 Base Enacted	FY 2015 OCO Enacted	FY 2015 Total Enacted	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Section
3	0601110D8Z	Basic Research Initiatives	01	11,682	44,500		44,500	42,022		42,022	U
5	0601120D8Z	National Defense Education Program	01	72,866	58,405		58,405	49,453		49,453	U
6	0601228D8Z	Historically Black Colleges and Universities/Minority Institutions	01	33,883	34,412		34,412	25,834		25,834	U
		Basic Research		118,431	137,317		137,317	117,309		117,309	
8	0602000D8Z	Joint Munitions Technology	02	17,693	20,037		20,037	19,352		19,352	U
10	0602234D8Z	Lincoln Laboratory Research Program	02	40,469	47,807		47,807	51,026		51,026	U
11	0602251D8Z	Applied Research for the Advancement of S&T Priorities	02	33,543	41,905		41,905	48,226		48,226	U
16	0602668D8Z	Cyber Security Research	02	11,637	14,979		14,979	13,727		13,727	U
17	0602670D8Z	Human, Social and Culture Behavior Modeling (HSCB) Applied Research	02	2,000							U
22	0602751D8Z	Software Engineering Institute (SEI) Applied Research	02	10,699	9,143		9,143	8,824		8,824	U
		Applied Research		116,041	133,871		133,871	141,155		141,155	
24	0603000D8Z	Joint Munitions Advanced Technology	03	19,709	26,650		26,650	25,915		25,915	U
25	0603121D8Z	SO/LIC Advanced Development	03	17,212	8,670		8,670				U
26	0603122D8Z	Combating Terrorism Technology Support	03	98,197	94,541		94,541	71,171		71,171	U
27	0603133D8Z	Foreign Comparative Testing	03		22,000		22,000	21,782		21,782	U
35	0603225D8Z	Joint DoD-DoE Munitions Technology Development	03	18,595	19,308		19,308	18,802		18,802	U
40	0603288D8Z	Analytic Assessments	03		12,000		12,000	14,645		14,645	U

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Line No	Program Element Number	Item	Act	FY 2014 (Base & OCO)	FY 2015 Base Enacted	FY 2015 OCO Enacted	FY 2015 Total Enacted	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Se
41	0603289D8Z	Advanced Innovative Analysis and Concepts	03		50,000		50,000	59,830		59,830	U
44	0603527D8Z	RETRACT LARCH	03					118,666		118,666	U
45	0603618D8Z	Joint Electronic Advanced Technology	03	8,772	10,949		10,949	43,966		43,966	U
46	0603648D8Z	Joint Capability Technology Demonstrations	03	153,770	119,790		119,790	141,540		141,540	U
47	0603662D8Z	Networked Communications Capabilities	03	5,075				6,980		6,980	U
48	0603668D8Z	Cyber Security Advanced Research	03	11,150							U
49	0603670D8Z	Human, Social and Culture Behavior Modeling (HSCB) Advanced Development	03	2,000							U
50	0603680D8Z	Defense-Wide Manufacturing Science and Technology Program	03	59,996	90,966		90,966	157,056		157,056	U
51	0603699D8Z	Emerging Capabilities Technology Development	03	52,535	33,658		33,658	33,515		33,515	U
54	0603716D8Z	Strategic Environmental Research Program	03	60,651	57,714		57,714	65,836		65,836	U
56	0603727D8Z	Joint Warfighting Program	03	3,325	5,396		5,396	9,626		9,626	U
62	0603781D8Z	Software Engineering Institute	03	18,167	15,754		15,754	15,202		15,202	U
63	0603826D8Z	Quick Reaction Special Projects	03	69,508	59,235		59,235	90,500		90,500	U
65	0603832D8Z	DoD Modeling and Simulation Management Office	03	31,222	2,995		2,995				U
66	0603833D8Z	Engineering Science & Technology	03					18,377		18,377	U
67	0603941D8Z	Test & Evaluation Science & Technology	03	81,247	81,033		81,033	82,589		82,589	U

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68	0604055D8Z	Operational Energy Capability Improvement	03	47,240	46,300		46,300	37,420		37,420	U
69	0303310D8Z	CWMD Systems	03	47,819	46,001		46,001	42,488		42,488	U
		Advanced Technology Development		806,190	802,960		802,960	1,075,906		1,075,906	
71	0603161D8Z	Nuclear and Conventional Physical Security Equipment RDT&E ADC&P	04	46,889	41,014		41,014	31,710		31,710	U
72	0603527D8Z	RETRACT LARCH	04	18,625							U
73	0603600D8Z	WALKOFF	04	63,988	90,558		90,558	90,567		90,567	U
74	0603714D8Z	Advanced Sensors Application Program	04	19,190	19,490		19,490	15,900		15,900	U
75	0603851D8Z	Environmental Security Technical Certification Program	04	64,756	63,871		63,871	52,758		52,758	U
93	0603920D8Z	Humanitarian Demining	04	11,395	10,180		10,180	10,129		10,129	U
94	0603923D8Z	Coalition Warfare	04	9,597	10,125		10,125	10,350		10,350	U
95	0604016D8Z	Department of Defense Corrosion Program	04	19,637	12,907		12,907	1,518		1,518	U
97	0604250D8Z	Advanced Innovative Technologies	04	125,811	174,752		174,752	469,798		469,798	U
98	0604400D8Z	Department of Defense (DoD) Unmanned Aircraft System (UAS) Common Development	04	7,977	7,791		7,791	3,129		3,129	U
100	0604670D8Z	Human, Social and Culture Behavior Modeling (HSCB) Research and Engineering	04	2,000							U
101	0604775D8Z	Defense Rapid Innovation Program	04	175,000	225,000		225,000				U
113	0605170D8Z	Support to Networks and Information Integration	04		12,482		12,482				U

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114	0303191D8Z	Joint Electromagnetic Technology (JET) Program	04	3,150	2,651		2,651	2,660		2,660	U
		Advanced Component Development And Prototypes		568,015	670,821		670,821	688,519		688,519	
116	0604161D8Z	Nuclear and Conventional Physical Security Equipment RDT&E SDD	05	7,859	7,925		7,925	8,800		8,800	U
117	0604165D8Z	Prompt Global Strike Capability Development	05	63,491	95,626		95,626	78,817		78,817	U
120	0604771D8Z	Joint Tactical Information Distribution System (JTIDS)	05	16,938	17,537		17,537	14,285		14,285	U
124	0605022D8Z	Defense Exportability Program	05	3,640	3,238		3,238	3,273		3,273	U
125	0605027D8Z	OUSD(C) IT Development Initiatives	05	6,599	6,500		6,500	5,962		5,962	U
127	0605075D8Z	DCMO Policy and Integration	05	19,318	19,324		19,324	2,223		2,223	U
130	0605210D8Z	Defense-Wide Electronic Procurement Capabilities	05	5,659	9,546		9,546	7,209		7,209	U
132	0305304D8Z	DoD Enterprise Energy Information Management (EEIM)	05	3,482	3,660		3,660	4,414		4,414	U
		System Development And Demonstration		126,986	163,356		163,356	124,983		124,983	
133	0604774D8Z	Defense Readiness Reporting System (DRRS)	06	6,353	5,607		5,607	5,581		5,581	U
134	0604875D8Z	Joint Systems Architecture Development	06	2,389	3,087		3,087	3,081		3,081	U
135	0604940D8Z	Central Test and Evaluation Investment Development (CTEIP)	06	175,908	239,163		239,163	229,125		229,125	U
136	0604942D8Z	Assessments and Evaluations	06	2,051	15,639		15,639	28,674		28,674	U
137	0604943D8Z	Thermal Vicar	06	8,099							U

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138	0605100D8Z	Joint Mission Environment Test Capability (JMETC)	06	27,491	27,124		27,124	45,235		45,235	U
139	0605104D8Z	Technical Studies, Support and Analysis	06	21,200	24,466		24,466	24,936		24,936	U
140	0605117D8Z	Foreign Materiel Acquisition and Exploitation	06	46,911	46,781		46,781				U
142	0605128D8Z	Classified Program USD(P)	06	99,957	100,000		100,000				U
143	0605130D8Z	Foreign Comparative Testing	06	11,877							U
144	0605142D8Z	Systems Engineering	06	38,205	44,683		44,683	37,655		37,655	U
145	0605151D8Z	Studies and Analysis Support - OSD	06	5,806	2,660		2,660	3,015		3,015	U
146	0605161D8Z	Nuclear Matters-Physical Security	06	4,816	4,359		4,359	5,287		5,287	U
147	0605170D8Z	Support to Networks and Information Integration	06	6,090	27,861		27,861	5,289		5,289	U
148	0605200D8Z	General Support to USD (Intelligence)	06	6,466	2,850		2,850	2,120		2,120	U
153	0605502D8Z	Small Business Innovative Research	06	55,640							U
158	0605790D8Z	Small Business Innovation Research (SBIR)/ Small Business Technology Transfer	06	1,790	1,631		1,631	2,169		2,169	U
159	0605798D8Z	Defense Technology Analysis	06	9,393	22,074		22,074	13,960		13,960	U
162	0605804D8Z	Development Test and Evaluation	06	18,698	19,160		19,160	17,371		17,371	U
164	0606100D8Z	Budget and Program Assessments	06	4,005	4,093		4,093	4,123		4,123	U
165	0203345D8Z	Defense Operations Security Initiative (DOSI)	06	5,161	1,952		1,952	1,946		1,946	U
170	0303260D8Z	Defense Military Deception Program Office (DMDPO)	06					971		971	U

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

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171	0305193D8Z	Cyber Intelligence	06	7,586	6,738		6,738	6,579		6,579	U
173	0804767D8Z	COCOM Exercise Engagement and Training Transformation (CE2T2) - MHA	06	38,245	38,950		38,950	43,811		43,811	U
177	0909999D8Z	Financing for Cancelled Account Adjustments	06	941							U
		Management Support		605,078	638,878		638,878	480,928		480,928	
181	0607210D8Z	Industrial Base Analysis and Sustainment Support	07	9,638	14,756		14,756	22,576		22,576	U
182	0607310D8Z	CWMD Systems: Operational Systems Development	07	1,872	2,948		2,948	1,901		1,901	U
199	0303140D8Z	Information Systems Security Program	07	10,313	11,288		11,288	8,957		8,957	U
204	0303260D8Z	Defense Military Deception Program Office (DMDPO)	07	1,144	949		949				U
211	0305125D8Z	Critical Infrastructure Protection (CIP)	07	9,711	8,834		8,834				U
215	0305186D8Z	Policy R&D Programs	07	3,332	7,055		7,055	4,182		4,182	U
216	0305199D8Z	Net Centricity	07	16,005	23,950		23,950	18,130		18,130	U
226	0305387D8Z	Homeland Defense Technology Transfer Program	07	2,308	2,106		2,106	2,119		2,119	U
227	0305600D8Z	International Intelligence Technology and Architectures	07	4,363							U
		Operational System Development		58,686	71,886		71,886	57,865		57,865	
Total Research, Development, Test & Eval, DW				2,399,427	2,619,089		2,619,089	2,686,665		2,686,665	

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16	02	0602668D8Z	Cyber Security Research.....	Volume 3 - 59
17	02	0602670D8Z	Human Social Culture Behavior (HSCB) Modeling Applied Research.....	Volume 3 - 67
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25	03	0603121D8Z	SO/LIC Advanced Development.....	Volume 3 - 93
26	03	0603122D8Z	Combating Terrorism Technology Support.....	Volume 3 - 105
27	03	0603133D8Z	Foreign Comparative Testing.....	Volume 3 - 131
35	03	0603225D8Z	Joint DOD/DOE Munitions Technology Development.....	Volume 3 - 139
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47	03	0603662D8Z	Networked Communications Capability.....	Volume 3 - 213
48	03	0603668D8Z	Cyber Security Advanced Research.....	Volume 3 - 219
49	03	0603670D8Z	Human Social Culture Behavior (HSCB) Modeling Advanced Development.....	Volume 3 - 225
50	03	0603680D8Z	Defense Wide Manufacturing Science and Technology Program.....	Volume 3 - 229
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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
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 1: <i>Basic Research</i>	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	11.682	44.500	42.022	-	42.022	39.011	41.206	43.590	46.230	Continuing	Continuing
P010: <i>Basic Research Initiatives</i>	-	11.682	11.371	11.528	-	11.528	11.548	12.148	12.248	12.493	Continuing	Continuing
P060: <i>National Security Science and Engineering Faculty Fellowship (NSSEFF)</i>	-	-	33.129	30.494	-	30.494	27.463	29.058	31.342	33.737	Continuing	Continuing

Note

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from the National Defense Education Program (NDEP), Program Element (PE) 0601120D8Z, to PE 0601110D8Z, project code P060, in fiscal year (FY) 2015.

A. Mission Description and Budget Item Justification

Supporting basic research provides the 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 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.

Strategic Support for Basic Research (SSBR) supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering (ASD(R&E))’s strategic plan for defense basic research. This plan defines specific and quantifiable actions to help create conditions for defense basic research investments capable of creating 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 defense-wide basic research program in the social sciences directed by the OSD and executed by the Services, seeks to build a deeper understanding of the social, cultural, and political forces that shape the U.S. security interests around the world. Deeper understanding of the social and cultural environments, where threats such as radical actors 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 QDR, informing DoD efforts to effectively build security globally.

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from the National Defense Education Program (NDEP), PE 0601120D8Z, to this PE beginning in FY 2015. The NSSEFF program supports world-class researchers in scientific areas of critical importance to DoD and ensures the

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 1: Basic Research</i>	PE 0601110D8Z / <i>Basic Research Initiatives</i>

cultivation of exceptional talent. Fellows' work spans a broad set of emerging scientific areas. The NSSEFF program is a key resource that fosters close connections between academia and the DoD science and engineering enterprise, a primary goal of SSBR efforts. Fellows provide DoD the deep scientific expertise of today's leading research universities and collaborate with DoD scientists and engineers.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	11.169	44.564	46.709	-	46.709
Current President's Budget	11.682	44.500	42.022	-	42.022
Total Adjustments	0.513	-0.064	-4.687	-	-4.687
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.837	-			
• SBIR/STTR Transfer	-0.324	-			
• FFRDC Sec 8104	-	-0.064	-	-	-
• Realignment for Higher Priority Programs	-	-	-4.576	-	-4.576
• Economic Assumptions	-	-	-0.111	-	-0.111

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>				Project (Number/Name) P010 / <i>Basic Research Initiatives</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P010: <i>Basic Research Initiatives</i>	-	11.682	11.371	11.528	-	11.528	11.548	12.148	12.248	12.493	Continuing	Continuing

A. Mission Description and Budget Item Justification

Supporting basic research provides the Department of Defense 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.

Strategic Support for Basic Research (SSBR) supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering (ASD(R&E))’s strategic plan for defense basic research. This plan defines specific and quantifiable actions to help create conditions for defense basic research investments capable of creating 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.

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Strategic Support for Basic Research (SSBR)	2.500	2.000	2.000
Description: The SSBR program funds specific and quantifiable actions to help create conditions for defense basic research investments capable of creating 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 2014 Accomplishments: Planned workshops for scientific situational awareness. Developed a request for information (RFI) to enable the national research communities to provide input to DoD regarding rapidly-advancing areas of fundamental research that may ultimately have an impact on national security. Convened national research leaders to provide expert perspectives on potential breakthroughs and barriers to advancement in rapidly evolving fields of basic research. Analyzed university-related business practices for			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>	Project (Number/Name) P010 / <i>Basic Research Initiatives</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>efficiencies. Continued support for scientific expertise to oversee engineering and science initiatives. Conducted town-hall events to foster active connections with research universities.</p> <p>FY 2015 Plans: Use the input developed from the FY 2014 RFI to inform topic selection. Conduct a series of four to six workshops to provide the status of rapid research progress and evolving world leadership in these fields. Convene national research leaders to provide external perspectives on potential breakthroughs and barriers to advancement in rapidly evolving fields of basic research. Initiate 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 engineering and science initiatives. Conduct an ASD(R&E) Deans for Research dialog to foster active connections with research universities.</p> <p>FY 2016 Plans: Complete the series of workshops for scientific situational awareness that were planned in FY 2014 and started in FY 2015. Convene National research leaders to provide expert perspectives on potential breakthroughs and barriers to 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 engineering and science initiatives.</p>				
<p>Title: Minerva Research Initiative</p> <p>Description: The Minerva Research Initiative includes two primary components: a university-based social science basic research grant program and 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, critically, building cultural and foreign area knowledge and insights. This deeper understanding will provide a more informed basis to shape doctrine, analysis, and other strategic and operational decisions made by war planners and war fighters.</p> <p>FY 2014 Accomplishments: A Department-wide solicitation of critical defense social science questions to be set as Minerva priority research areas drew responses from Service leadership, the Defense Advanced Research Projects Agency (DARPA), Combatant Commands (COCOMs), J5, the intelligence community, and others. The resulting broad agency announcement (BAA) and correlated source selection process identified several new university-led research grants to be awarded in these newly derived focus areas. The FY 2014 BAA yielded 260 submissions from which 12 proposals were selected for three- to five-year awards by panels of defense Science and Technology (S&T) managers, defense policy makers, and academic experts in accordance with the appropriated FY 2014 budget.</p>		9.182	9.371	9.528

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>	Project (Number/Name) P010 / <i>Basic Research Initiatives</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>The Minerva Research Fellows (Chairs) program (active from FY 2010 through FY 2013) was restructured to more effectively build in-house social science capabilities and better connect social science research insights to current and future defense leadership at PME institutions and elsewhere. The Research for Defense Education Faculty (R-DEF) program was designed to augment existing institutional resources by enabling activities such as research by active teaching faculty, PME curriculum development, new academic-government exchange opportunities, and research-informed tabletop exercises. A pilot solicitation yielded support for 14 small projects.</p> <p>FY 2015 Plans: Inputs from Service leadership, DARPA, J5, the intelligence community, and others in the defense community informed updated topics in the FY 2015 BAA. 297 initial submissions were received; six new three- to five-year university-led research grants are anticipated.</p> <p>The R-DEF program will expand at participating PMEs and military service academies, further strengthening DoD-internal social science capabilities by offering new research opportunities for teaching faculty through summer or semester-long research funding and course buyouts and by enabling activities such as academic-government exchange opportunities, new curriculum development, and research-informed tabletop exercises.</p> <p>FY 2016 Plans: Continue ongoing and start new university-led research initiatives. Maintain support of R-DEF program at defense education institutions. 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.</p>			
Accomplishments/Planned Programs Subtotals	11.682	11.371	11.528

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>	Project (Number/Name) P060 / <i>National Security Science and Engineering Faculty Fellowship (NSSEFF)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P060: <i>National Security Science and Engineering Faculty Fellowship (NSSEFF)</i>	-	-	33.129	30.494	-	30.494	27.463	29.058	31.342	33.737	Continuing	Continuing

Note

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from the National Defense Education Program (NDEP), Program Element (PE) 0601120D8Z, to this PE beginning in FY 2015.

A. Mission Description and Budget Item Justification

The National Security Science and Engineering Faculty Fellowship (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. The NSSEFF program is a key resource that fosters close connections between academia and the DoD science and engineering enterprise, a primary goal of SSBR efforts. Its Fellows provide DoD the deep scientific expertise of today's leading research universities and collaborate with DoD scientists and engineers.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: National Security Science and Engineering Faculty Fellowship (NSSEFF)	-	33.129	30.494
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 Plans: Continue support for current NSSEFF Fellows. Review program topic areas, eligibility, review process, and selection criteria. Solicit for a new class of NSSEFF Fellows. Organize and conduct a NSSEFF-DoD orientation event 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.			
FY 2016 Plans: Continue support for current NSSEFF Fellows. Review program topic areas. Solicit for a new class of NSSEFF Fellows. Organize and conduct a NSSEFF-DoD orientation event 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			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601110D8Z / <i>Basic Research Initiatives</i>	Project (Number/Name) P060 / <i>National Security Science and Engineering Faculty Fellowship (NSSEFF)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
and conduct a program review and report on Fellows' progress. Organize and conduct a DoD laboratory-wide competition and selection for collaborative research projects between DoD researchers and NSSEFF Fellows in areas of scientific or technological importance to DoD.			
Accomplishments/Planned Programs Subtotals	-	33.129	30.494

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 1: Basic Research</i>					PE 0601120D8Z / <i>National Defense Education Program (NDEP)</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	72.866	58.405	49.453	-	49.453	49.398	50.244	53.378	54.060	Continuing	Continuing
P120: <i>National Defense Education Program (NDEP)</i>	-	72.866	58.405	49.453	-	49.453	49.398	50.244	53.378	54.060	Continuing	Continuing

Note

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from Program Element (PE) 0601120D8Z to PE 0601110D8Z (P060), Basic Research Initiatives, in fiscal year FY 2015.

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 solutions to workforce challenges, which include: (1) impending retirement of 33 percent of DoD's STEM workforce; (2) low college readiness rate and interest in STEM majors; and (3) challenges that DoD, like other Federal employers, face in recruiting and retaining high-quality STEM talent in a competitive environment.

NDEP aligns to the DoD Science and Technology (S&T) priorities and the Historically Black Colleges and Universities and Minority Institutions (HBCU/MIs) program. It is synchronized with the Federal Five-Year STEM Strategic Plan, the DoD STEM Strategic Plan, and the DoD Strategic Workforce 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. Internships engage SMART scholars in 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 supported approximately 1,575 students from bachelor to doctoral levels and, to date, approximately 900 have completed program studies and are currently employed in the DoD workforce. SMART ensures that DoD has a steady infusion of high-quality U.S. technical talent, prepared in areas of critical importance to DoD, ready to apply their technical knowledge, skills, and abilities to fulfill DoD's mission.

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from the NDEP PE to PE 0601110D8Z, beginning in FY 2015. 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. The NSSEFF program is a key resource that fosters close connections between academia and the DoD science and engineering enterprise, a primary goal of Strategic Support for Basic Research (SSBR) efforts. Fellows provide DoD the deep scientific expertise of today's leading research universities and collaborate with DoD scientists and engineers.

STEM Activities Support (SAS) supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering (ASD(R&E))'s strategic plan for STEM. SAS fosters conditions for STEM investments to support a diverse, world-class STEM talent pool and workforce to meet national defense needs. Initiatives

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 1: <i>Basic Research</i>	PE 0601120D8Z / <i>National Defense Education Program (NDEP)</i>

include developing and implementing policy guidance, conducting analyses, and developing standards, while ensuring adherence to DoD and Federal initiatives and objectives.

Section 233 of the National Defense Authorization Act 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 and provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled. In FY 2016, the Pre-kindergarten through twelfth grade (P-12) Military Child STEM Educational Program continues support for the pilot program.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	77.241	45.488	48.212	-	48.212
Current President's Budget	72.866	58.405	49.453	-	49.453
Total Adjustments	-4.375	12.917	1.241	-	1.241
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	13.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.536	-			
• SBIR/STTR Transfer	-2.839	-			
• FFRDC Sec 8104	-	-0.083	-	-	-
• P-12 Military Child STEM Educational Program	-	-	3.000	-	3.000
• Realignment for Higher Priority Programs	-	-	-1.627	-	-1.627
• Economic Assumptions	-	-	-0.132	-	-0.132

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: P120: *National Defense Education Program (NDEP)*

Congressional Add: *Military Child STEM Educational Programs*

	FY 2014	FY 2015
	-	13.000
Congressional Add Subtotals for Project: P120	-	13.000
Congressional Add Totals for all Projects	-	13.000

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To	Total
											Complete	Cost
P120: National Defense Education Program (NDEP)	-	72.866	58.405	49.453	-	49.453	49.398	50.244	53.378	54.060	Continuing	Continuing

Note

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from PE 0601120D8Z to PE 0601110D8Z (P060), Basic Research Initiatives, in FY 2015.

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 solutions to workforce challenges, which include: (1) impending retirement of 33 percent of the Department's STEM workforce; (2) low college readiness rate and interest in STEM majors; and (3) challenges that the DoD, like other Federal employers, face in recruiting and retaining high-quality STEM talent in a competitive environment.

NDEP aligns to the DoD Science and Technology (S&T) priorities and the Historically Black Colleges and Universities and Minority Institutions (HBCU/MIs) program. It is synchronized with the Federal Five-Year STEM Strategic Plan, the DoD STEM Strategic Plan, and the DoD Strategic Workforce 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. Internships engage SMART scholars in 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 supported approximately 1,575 students from bachelor to doctoral levels and, to date, approximately 900 have completed program studies and are currently employed in the DoD workforce. SMART ensures that DoD has a steady infusion of high-quality U.S. technical talent, prepared in areas of critical importance to DoD, ready to apply their technical knowledge, skills, and abilities to fulfill DoD's mission.

The National Security Science and Engineering Faculty Fellowship (NSSEFF) program was realigned from the NDEP PE to PE 0601110D8Z, beginning in FY 2015. 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. The NSSEFF program is a key resource that fosters close connections between academia and the DoD science and engineering enterprise, a primary goal of Strategic Support for Basic Research (SSBR) efforts. Fellows provide DoD the deep scientific expertise of today's leading research universities and collaborate with DoD scientists and engineers.

STEM Activities Support (SAS) supports initiatives to implement the Assistant Secretary of Defense for Research and Engineering (ASD(R&E))'s strategic plan for STEM. SAS fosters conditions for STEM investments to support a diverse, world-class STEM talent pool and workforce to meet national defense needs. Initiatives

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601120D8Z / <i>National Defense Education Program (NDEP)</i>	Project (Number/Name) P120 / <i>National Defense Education Program (NDEP)</i>
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include developing and implementing policy guidance, conducting analyses, and developing standards, while ensuring adherence to DoD and Federal initiatives and objectives.

Section 233 of the National Defense Authorization Act 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 and provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled. In FY 2016, the Pre-kindergarten through twelfth grade (P-12) Military Child STEM Educational Program continues support for the pilot program.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Science, Mathematics, and Research for Transformation (SMART) Defense Education Program</p> <p>Description: SMART is a scholarship-for-service program that provides support to high performing U.S. graduate and undergraduate students in 19 academic STEM disciplines identified as areas of future workforce need by DoD.</p> <p>The disciplines align with the Department's seven S&T priorities and emerging scientific research areas. The disciplines are: 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 remain in the DoD workforce beyond their required service commitment. 77 percent have completed their service commitment and are still employed by DoD beyond their original service commitment.</p> <p>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.</p> <p>Since FY 2005, approximately 1,575 students have participated in the SMART program at approximately 160 sponsoring facilities. As of August 2014, approximately 900 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Provided oversight to the SMART program per Directive-Type Memorandum (DTM) 13-007 and began coordination of a draft DoD Instruction (DoDI). 	37.692	36.000	37.000

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	
<ul style="list-style-type: none"> Continued to examine the effectiveness of efforts to increase the number of eligible applicants from underrepresented groups, such as women and minorities, veterans, and individuals preparing to separate from the military. Continued to enhance relationships between SMART and HBCU/MIs. Continued to assess SMART mentoring and workforce development initiatives for current participants and the effectiveness of the transition process. Transitioned approximately 100 participants into the DoD workforce. Increased the number of candidate spots and select new participants based on available funding. Continued to document effectiveness of SMART program with metrics such as: (1) percentage of eligible SMART participants transitioned to the DoD workforce; and (2) percentage of SMART scholars retained post-service commitment. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Establish a SMART DoDI in accordance with DTM 13-007. Transition the SMART program to the Services with Navy as Lead Service. Continue to examine the effectiveness of efforts to increase the number of eligible applicants from underrepresented groups such as women and minorities, veterans, and individuals preparing to separate from the military. Examine SMART participation at HBCU/MIs. Continue to assess SMART mentoring and workforce development initiatives for current participants and the effectiveness of the transition process. Transition approximately 100 participants into the DoD workforce. Increase the number of candidate spots and select new participants based on available funding. Document effectiveness of SMART program with metrics such as: (1) percentage of eligible SMART participants transitioned to the DoD workforce; (2) percentage of SMART scholars retained post-service commitment; and (3) percentage of SMART participants enrolled at HBCU/MIs. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Provide oversight of the SMART program per DTM 13-007 and SMART DoDI. Fully transition the SMART program to the Services. 				
<p>Title: National Security Science and Engineering Faculty Fellowship (NSSEFF)</p> <p>Description: NSSEFF ensures that the DoD has a research portfolio that supports the foremost creative, innovative, and productive university researchers.</p> <p>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</p>		20.940	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>students with DoD's current and future challenges; and (5) increase the number of exceptionally talented technical experts that are contributing to the Department's mission.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Continued support for current NSSEFF Fellows. Conducted a NSSEFF program review and report on Fellows' progress. Used this venue to identify and facilitate new connections between Fellows and defense scientists and engineers. Issued a new competitive solicitation for NSSEFF Fellows. Developed metrics for NSSEFF program effectiveness as both a high prestige scientific program for national leaders in their fields, and as an effective means for long-term engagement of the Principal Investigators (PIs) and their research teams with DoD scientific staff. 			
<p>Title: STEM Activities Support (SAS)</p> <p>Description: SAS supports initiatives to implement the ASD(R&E)'s strategic plan for STEM. SAS fosters conditions for STEM investments to support a diverse, world-class STEM talent pool and workforce to meet national defense needs. Initiatives include developing and implementing policy guidance, conducting analyses, and developing standards, while ensuring adherence to DoD and Federal initiatives and objectives.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Provided DoD-wide STEM guidance and oversight through the STEM Executive Board and Executive Board Working Group. Executed national STEM program in partnership with laboratories and facilities, i.e. For Inspiration and Recognition of Science and Technology Robotics Competition. Implemented the STEM Diversity Campaign in coordination with the Office of Diversity Management and Equal Opportunity (Office of the Under Secretary of Defense for Personnel and Readiness) and the Services/Components. Managed the development of the STEM DoD Instruction. Supported activities for the SMART program, including participant selections and awards, contracts, governance, debt collection and program improvements. Completed the collection of baseline information for the FY 2014 Annual Performance Plan and Accountability Report (APPAR). Participated in interagency collaboration on the Committee on Science, Technology, Engineering, and Math Education (CoSTEM), interagency working groups, and the Science and Engineering Workforce Fast Track Action Group. Provided responses to Congressional inquiries and U.S. Government Accountability Office (GAO) reports. Completed Acquisition, Technology, and Logistics STEM Inventory Report. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Continue program management and oversight, studies support, and responses to Congressional inquiries and other reports. 	14.234	9.405	9.453

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015
<ul style="list-style-type: none"> Develop systems and standards to support STEM policy implementation, oversight, and assessment. Enhance assessment and evaluation standards to support investment decision making. Implement policy, assign responsibilities, and provide policy guidance including the STEM Instruction and legislative proposals. Support inter- and intra-departmental collaboration to achieve DoD and Federal objectives in STEM. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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. Implement policy, assign responsibilities and provide policy guidance including the STEM Instruction and legislative proposals. Support inter- and intra-departmental collaboration to achieve DoD and Federal objectives in STEM. Provide support and coordinate Departmental participation in the USA Science and Engineering Festival. 			
<p>Title: P-12 Military Child STEM Educational Program</p> <p>Description: The P-12 Military Child STEM Educational Program supports the pilot program established in FY 2015. The objectives are to enhance the preparation of dependents of members of the armed forces for careers in STEM and provide assistance to STEM teachers at elementary or secondary schools at which a significant number of military dependents are enrolled.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Continue implementation and assessment of the pilot program. Expand access for military-connected children to attend classes in STEM. 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 report on activities carried out under the pilot program. 		-	-
Accomplishments/Planned Programs Subtotals		72.866	45.405
		FY 2014	FY 2015
Congressional Add: Military Child STEM Educational Programs		-	13.000
<p>FY 2015 Plans: • Establish 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.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601120D8Z / <i>National Defense Education Program (NDEP)</i>	Project (Number/Name) P120 / <i>National Defense Education Program (NDEP)</i>
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	FY 2014	FY 2015
<ul style="list-style-type: none"> • Activities that may be implemented include: (1) expansion of access for military-connected children to attend classes in STEM at covered schools that service military families; (2) establishment of targeted internships and cooperative research opportunities for students and teachers at defense laboratories and other technical centers; (3) establishment of scholarships and fellowships; (4) efforts and activities that improve the quality of STEM educational and training opportunities for students and teachers, to include the development and improvement of curricula; and (5) development of travel opportunities, demonstrations, mentoring programs, and informal science education for students and teachers. • Establish 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. 		
Congressional Adds Subtotals	-	13.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- The increase in the direct and indirect connectivity of NDEP participants with DoD.
- SMART PhD scholars research productivity: (1) number of research papers; (2) number of research citations; (3) patents.
- 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 HBCU/MIs.
- The number of SMART application reviewers from HBCU/MIs.
- Benchmark the performance of SMART PhD scholars (i.e., time to degree) with those of their peers in the general U.S. PhD population.
- Increase directly and indirectly the connectivity of NSSEFF Fellows with the broad DoD S&T enterprise, including inclusion in special DoD task forces, advisory panels, and the broad set of engagements of PIs, postdocs, and students.
- The increase in the direct support and/or advancement of research into DoD S&T emphasis areas and emerging research areas by: (1) recognized transformational discoveries, insights, and other measures of scientific progress, such as scientifically relevant publications in peer reviewed journals; and (2) new patents filed/awarded in these areas.
- The number of co-authored papers between NSSEFF Fellows and DoD S&Es.
- Develop program to increase access for military-connected children to attend classes in STEM at covered schools that service military families.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 1: Basic Research</i>	R-1 Program Element (Number/Name) PE 0601228D8Z I <i>Historically Black Colleges and Universities and Minority Institutions</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	33.883	34.412	25.834	-	25.834	25.388	26.242	31.042	31.462	Continuing	Continuing
P448: <i>Historically Black Colleges and Universities and Minority Institutions</i>	-	33.883	34.412	25.834	-	25.834	25.388	26.242	31.042	31.462	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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 1: Basic Research</i>	PE 0601228D8Z I <i>Historically Black Colleges and Universities and Minority Institutions</i>

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	35.895	24.412	26.812	-	26.812
Current President's Budget	33.883	34.412	25.834	-	25.834
Total Adjustments	-2.012	10.000	-0.978	-	-0.978
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.692	-			
• SBIR/STTR Transfer	-1.320	-			
• Economic Assumptions	-	-	-0.073	-	-0.073
• Realignment for Higher Priority Programs	-	-	-0.905	-	-0.905

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 1					R-1 Program Element (Number/Name) PE 0601228D8Z / <i>Historically Black Colleges and Universities and Minority Institutions</i>				Project (Number/Name) P448 / <i>Historically Black Colleges and Universities and Minority Institutions</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P448: <i>Historically Black Colleges and Universities and Minority Institutions</i>	-	33.883	34.412	25.834	-	25.834	25.388	26.242	31.042	31.462	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 2014	FY 2015	FY 2016
Title: Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	33.883	34.412	25.834
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 2014 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601228D8Z / <i>Historically Black Colleges and Universities and Minority Institutions</i>	Project (Number/Name) P448 / <i>Historically Black Colleges and Universities and Minority Institutions</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Continued efforts from FY 2013. Conducted annual competition of the HBCU/MI program. Awarded 33 equipment grants totaling \$10.700 million. Continued the research and educational collaboration project between the Thurgood Marshall College Fund and a new initiative, STEM Prep with Paul Quinn College and Cheyney University of Pennsylvania. Increased the number of FY 2014 summer interns from 60 to 79 participants totaling \$3.000 million. Conducted competition for 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 totaling \$15.000 million.</p> <p>FY 2015 Plans: Continue efforts from FY 2014. Conduct annual competition of the HBCU/MI program for basic research and student support. Continue the research and educational collaboration with STEM Prep project with HBCUs: Paul Quinn College and Cheyney University of Pennsylvania. The goal is to increase the number of FY 2015 summer interns from 79 to 90 participants. Establish 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.</p> <p>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 with 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 90 to 100 participants. Continue the efforts from FY 2015 to establish 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.</p>			
Accomplishments/Planned Programs Subtotals	33.883	34.412	25.834

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Number of students funded other than undergraduates
- Number of undergraduate students funded
- Number of undergraduates funded who graduated

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 1	R-1 Program Element (Number/Name) PE 0601228D8Z / <i>Historically Black Colleges and Universities and Minority Institutions</i>	Project (Number/Name) P448 / <i>Historically Black Colleges and Universities and Minority Institutions</i>
<ul style="list-style-type: none">• 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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602000D8Z I <i>Joint Munitions Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	38.999	17.693	20.037	19.352	-	19.352	19.388	19.390	19.619	19.884	Continuing	Continuing
P000: <i>Insensitive Munitions</i>	27.369	12.288	13.545	13.082	-	13.082	13.106	13.108	13.262	13.442	Continuing	Continuing
P204: <i>Enabling Fuze Technology</i>	11.630	5.405	6.492	6.270	-	6.270	6.282	6.282	6.357	6.442	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)

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602000D8Z I <i>Joint Munitions Technology</i>
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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 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. These 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	17.959	20.065	20.085	-	20.085
Current President's Budget	17.693	20.037	19.352	-	19.352
Total Adjustments	-0.266	-0.028	-0.733	-	-0.733
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.009	-			
• SBIR/STTR Transfer	-0.257	-			
• Realignment for Higher Priority Programs	-	-	-0.678	-	-0.678
• FFRDC SEC 8104	-	-0.028	-	-	-
• Economic Assumptions	-	-	-0.055	-	-0.055

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P000: <i>Insensitive Munitions</i>	27.369	12.288	13.545	13.082	-	13.082	13.106	13.108	13.262	13.442	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 2014	FY 2015	FY 2016
Title: High Performance Rocket Propulsion (HPP)	3.442	3.673	3.556
<p>Description: HPP focuses 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 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Determined the IM response of less reactive propellants in steel and composite cases by conducting IM testing on sub-scale analogue motors. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Characterized less reactive propellants with advanced ingredients with safety testing, mechanical property measurements, variable confinement cook off testing, and slow cook off visualization testing. - Conducted small scale cook-off testing and gap testing on novel ionic liquid candidates for high performance propulsion. - Conducted small-scale slow cook-off study correlating historical subscale and full scale slow cook-off data for high performance rocket motors. - Formulated a novel high performance propellant in one pound quantities and conducted initial studies. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Synthesize and characterize less reactive ingredients for high performance rocket motor propellant that will maintain missile performance. - Conduct bench-top testing of motor case venting devices. - Conduct sub-scale testing and analysis to validate a new sub-scale test to predict full-scale reactions in cook-off and impact testing. - Conduct small scale testing on energetic materials to assess pre-ignition processes and novel mitigation device. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Scale up and conduct performance testing on rocket propellant formulation composed of less reactive ingredients. - Optimize novel mitigation device design and conduct small scale tests. - Scale up, conduct characterization, and aging testing on propellant formulation that is less temperature and impact sensitive. 				
<p>Title: Minimum Signature Rocket Propulsion (MSP)</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Generated multi-gram batches of novel coated materials. Produced one pint-scale mixes of two promising minimum signature propellants. 		2.321	2.577	2.472

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Scaled up and produced multi-grams of novel material. Built and down-selected candidate materials for unique venting mechanism. - Characterized two minimum signature propellants in a unique configuration to determine the go/no go threshold and investigated other design factors that contributed to ignition, to aide in the development of a modeling and simulation effort designed to predict the reaction of an analog rocket motor under fragment impact. - Completed propellant development program using new binder and conducted gap testing. - Conducted initial screening studies on two ingredients that have potential for MS propellants through solubility and ignition sensitivity testing. - Further narrowed the operational range for the autoignition materials and conducted trade studies. - Demonstrated Army Burn-to-Violent Reaction (ABVR) screening test as a discriminator for reaction violence. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct mechanical, safety, and card gap testing, and determine ballistic properties of novel coated material minimum signature propellant. - Conduct design of experiments of candidate formulations and down-select to most promising candidate to provide desired performance characteristics. - Conduct final characterization tests and slow cook-off tests to validate formulation. - Build and test unique venting mechanisms in various configurations in environmental and cook-off tests. - Characterize baseline and novel MS propellant using ABVR screening test. - Develop an analysis tool and conduct 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. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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 propellant ingredient to one kilogram batch for initial characterization studies. 				
Title: Blast and Fragmentation Warheads (BFW)		2.466	2.723	2.633
Description: BFW focuses on the development and demonstration 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 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,				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>

B. Accomplishments/Planned Programs (\$ in Millions)

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 2014 Accomplishments:

- Completed device scale experiments on sensitization process and transition to Budget Activity (BA) 6.3 project.
- Performed one kilogram scale-up of additional composite materials. Formulated and tested IM characteristics of the material.
- Synthesized 60 kilograms of new explosive ingredients and formulated explosives on the ten gallon scale. Determined mid-scale performance and IM properties of new formulations.
- Conducted thermal cycling and IM testing on novel explosive material.
- Scaled up to one gallon mix a melt cast enhanced blast explosive fill and performed sensitivity and performance testing. Prepared to transition to Task under Program Element (PE) 0603000D8Z/P301.
- Conducted characterization and performance testing, as well as IM assessments for novel general purpose bomb explosive fill formulation. Conducted characterization testing and down selected unique explosive booster material and transitioned to Task under PE 0603000D8Z/P301.
- Produced small quantities of unique energetic material for formulation and characterization testing.
- Conducted synthesis optimization process for novel energetic material and scaled up to produce several 100 gram batches.

FY 2015 Plans:

- Scale up synthesis process of novel energetic material to produce one kilogram batches to provide multiple grain size material. Examine fundamental properties and conduct characterization testing on manufactured materials.
- Perform safety, IM, and performance testing on novel energetic formulations. Analyze results to define failure diameter and establish baseline data for designing IM formulations for transition to a possible BA 6.3 demonstrator.
- Scale up to 40 gram batches unique energetic material and conduct performance and thermal response testing.
- Prove concept for detonation train for IM fills for large warheads. Analyze data for formulation to assess the insensitivity to an IM threat.
- Predict the potential for passing sympathetic reaction testing based on explosive data gathered during preliminary small-scale testing.

FY 2016 Plans:

- Conduct large scale gap testing, as well as bullet and fragment impact testing on unique explosive formulation for large warheads.

FY 2014	FY 2015	FY 2016

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<ul style="list-style-type: none"> - Optimize and 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. 			
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Title: Anti-Armor Warheads (AAW)	2.228	2.485	2.403
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Description: AAW focuses on the development and demonstration 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 Cookoff, and Sympathetic Reaction / Shaped Charge Jet threats for Medium Caliber Munitions.

FY 2014 Accomplishments:

- Scaled up and conducted IM testing of energetic materials with less nitramine content and enhanced insensitivity.
- Conducted small scale performance and mechanical properties testing on unique combined effects explosive formulation.
- Conducted aging study and scaled up formulations to 50 pound batches for novel, cast cured, multi-effects explosives formulation.
- Conducted larger scale formulation (five pounds) of explosive material and performed intermediate scale IM and performance tests.
- Produced unique high energy melt cast explosive formulation material for initial characterization and evaluation testing.
- Characterized materials, formulated, and down-selected high energy melt-phase explosive.
- Scaled up to five gallon mix, conducted initial testing, completed aging study, and conducted standard IM tests on novel, cast cured, multi-effects explosives formulation.
- Scaled up high energy pressed explosive and conducted performance testing.
- Assessed additional explosive materials to validate the baseline model data.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>- Down-selected optimized formulation and conducted IM testing on cast cured explosive, using fine grain material. Prepared to transition to Task under PE 0603000D8Z.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Scale up synthesis of newly identified explosive ingredient with high performance and low sensitivity potential. - Development and characterization of explosive formulations using a recently scaled-up newly identified explosive ingredient. - Conduct slow cook-off and small scale sympathetic detonation test on unique combined effects explosive formulation. - Down-select formulations of energetic materials composed of finer particle size nitramine content and enhanced insensitivity and conduct small scale cookoff and fragment impact testing. Prepare five pound batches of selected formulation. - Conduct 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. - Design surrogate munition and shaped charge jet impact initiation testing configurations to demonstrate models utility for weapon design. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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 characterization study of newly identified explosive ingredient with high performance and low sensitivity potential. 				
<p>Title: Gun Propulsion (GP)</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Conducted performance IM testing of down-selected candidates for gun propellants. 		1.831	2.087	2.018

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continued formulation development to manufacture six kilogram batches for extrusion into 30 pounds of propellant. Conducted various tests to validate IM properties and suitability for gun propellant. - Designed and fabricated apparatus to test propellants and developed modeling code for small-scale slow cook-off protocol. - Developed properties of ignition propellants after exposure to novel ignition methodology. Performed sub-scale performance testing. Produced one gallon mixes of novel binder to complete IM testing. - Scaled up six pounds of unique less sensitive binder propellant formulation and conducted characterization testing. - Conducted small scale unique processing of propellant grains. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct slow cook-off tests in new apparatus to validate test small scale test protocol for propellant formulations. - Establish data set of required material characteristics after exposure to novel ignition methodology. - Down select unique process ingredients and complete sub-scale IM testing of propellant. - Optimize propellant candidates for new projectile and evaluate for performance and sensitivity. Scale-up and characterize new primer to conduct modeling and to optimize the configuration to enable full scale testing. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Optimize 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. 			
Accomplishments/Planned Programs Subtotals	12.288	13.545	13.082

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603000D8Z P002: BA 3 <i>Insensitive Munitions</i> <i>Advanced Technology</i>	16.312	19.788	19.229	-	19.229	19.248	19.293	19.446	19.701	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P000 / <i>Insensitive Munitions</i>
<p>2) Munition Area Technology Group (MATG) Technology Roadmaps are prepared, evaluated, and analyzed by Joint Insensitive Munitions Technology Program management and technical staff.</p> <p>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.</p> <p>4) Project progress toward goals and milestones is assessed at each MATG meeting.</p> <p>5) Annual technical reports and papers are tracked and documented for the Program.</p> <p>6) External Peer Review of Projects conducted as part of Joint Army/Navy/NASA/Air Force meetings.</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P204: <i>Enabling Fuze Technology</i>	11.630	5.405	6.492	6.270	-	6.270	6.282	6.282	6.357	6.442	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 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 2014	FY 2015	FY 2016
Title: Hard Target Fuzing	1.393	1.663	1.617
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 and 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 2014 Accomplishments:			
- Adapted and transitioned JFTP developed testing protocol in boosted and high speed penetrator development programs.			
- Demonstrated and transitioned survivable modular fuze technology for multi-role common miniature munitions with distributed/embedded fuzes.			
FY 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P204 / <i>Enabling Fuze Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>- Develop and demonstrate alternative packaging technology for the electronic components of a fireset to improve fuze survivability and reliability for hypersonic penetrating weapon applications.</p> <p>FY 2016 Plans:</p> <p>- Develop low cost, survivable hard target detonators for next generation penetrator weapons and test against extreme levels of shock and vibration associated with the long duration penetrating events.</p>				
<p>Title: Tailorable Effects Fuzing</p> <p>Description: This area focuses on developing 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); developing initiation and multi-point technologies to include 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.</p> <p>FY 2014 Accomplishments:</p> <p>- Demonstrated and transitioned into BA 6.3 advanced technology development of detonator, initiation, and fireset technologies.</p> <p>- Applied initiation architecture and control technologies for application in the Services’ warhead development programs.</p> <p>FY 2015 Plans:</p> <p>- Begin development of a primary explosive ink with high output and low sensitivity for use in MEMS micro-detonators.</p> <p>FY 2016 Plans:</p> <p>- Demonstrate and transition into BA 6.3 advanced technology development of Hardened Selectable Multipoint Fireset technologies.</p>		1.374	1.646	1.512
<p>Title: High Reliability Fuzing</p> <p>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 reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies.</p> <p>FY 2014 Accomplishments:</p>		1.333	1.605	1.595

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P204 / <i>Enabling Fuze Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>- Researched and developed novel technologies for UXO reduction features including fuze mechanisms and initiation energetic to eliminate any unexploded ordnance.</p> <p>FY 2015 Plans:</p> <p>- Develop and demonstrate MEMS structures that give existing MEMS Fuzes the ability to self-report safety and reliability compromises in an effort to improve reliability.</p> <p>FY 2016 Plans:</p> <p>- Complete testing and characterization of MEMS safety and arming (S&A) micro scale materials and energetic to transition into high reliability low cost munitions technology applications.</p>			
<p>Title: Enabling Fuze Technologies</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <p>- Conducted assessments of common fuze architecture technologies: safety components, modular electronics, sensors, interfaces, and packaging.</p> <p>FY 2015 Plans:</p> <p>- Begin research of failure modes in flash programmable logic devices (F-PLD) that enables reliable, safe, and effective use of F-PLDs as fuze components.</p> <p>FY 2016 Plans:</p> <p>- Develop and demonstrate low cost, small energy harvesting, and event detection sensors for Gravity Dropped Weapons.</p>	1.305	1.578	1.546
Accomplishments/Planned Programs Subtotals	5.405	6.492	6.270

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2016</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• 0603000D8Z P301: <i>BA 3 Enabling Fuze Advanced Technology</i>	3.397	6.862	6.686	-	6.686	6.693	6.708	6.751	6.850	Continuing	Continuing
Remarks											

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602000D8Z / <i>Joint Munitions Technology</i>	Project (Number/Name) P204 / <i>Enabling Fuze Technology</i>

D. Acquisition Strategy

N/A

E. Performance Metrics

- 1) Transitions 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	67.081	40.469	47.807	51.026	-	51.026	51.369	50.473	56.881	57.690	Continuing	Continuing
P534: <i>Lincoln Laboratory</i>	56.925	31.859	37.792	42.078	-	42.078	41.929	44.786	50.297	51.018	Continuing	Continuing
P535: <i>Technical Intelligence</i>	6.950	8.284	10.015	8.948	-	8.948	9.440	5.687	6.584	6.672	Continuing	Continuing
P536: <i>Testbed for Comparative Analysis</i>	3.206	0.326	-	-	-	-	-	-	-	-	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 Electronics Technology, Communications Systems, Cyber Security and Information Sciences, Intelligence, Surveillance and Reconnaissance Systems and Technology, Tactical Systems, Space Control, and Air and Missile Defense. 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 electronics 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, 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 and Testbed for Comparative Analysis:

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>
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- Technical Intelligence is working to develop a comprehensive understanding of technology emergence and advancement in a range of relevant scientific areas such as nanotechnology, directed energy, and propulsion. Some details are classified, but one focus area is working to establish a broad horizon scanning and technology forecasting capability through a collaborative effort by the Department of Defense (DoD) and the Intelligence Community. This effort will develop insight into our relative position in science and technology around the world over time, as well as determine potential impacts on DoD capability development and future threat environments.

- The Testbed for Comparative Analysis will enable the evaluation of quantitative, horizon scanning and technology forecasting techniques for discovering disruptive technologies that may impact the DoD. This effort will provide the DoD with objective ways to evaluate the accuracy of existing and future horizon scanning and technology forecasting efforts.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	41.868	51.875	53.993	-	53.993
Current President's Budget	40.469	47.807	51.026	-	51.026
Total Adjustments	-1.399	-4.068	-2.967	-	-2.967
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.020	-			
• SBIR/STTR Transfer	-1.379	-			
• Realignment for Higher Priority Programs	-	-	-2.822	-	-2.822
• FFRDC SEC 8104	-	-0.068	-	-	-
• Economic Assumptions	-	-	-0.145	-	-0.145

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>				Project (Number/Name) P534 / <i>Lincoln Laboratory</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P534: <i>Lincoln Laboratory</i>	56.925	31.859	37.792	42.078	-	42.078	41.929	44.786	50.297	51.018	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 Electronics Technology, Communications Systems, Cyber Security and Information Sciences, Intelligence, Surveillance and Reconnaissance Systems and Technology, Tactical Systems, Space Control, and Air and Missile Defense. 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 electronics 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, 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 2014	FY 2015	FY 2016
Title: Advanced Devices	5.195	6.253	6.722
Description: This project develops materials, devices, and subsystems utilizing microelectronic, nanostructure, photonic, biological, and chemical technologies to enable new system approaches to Department of Defense (DoD) systems.			
FY 2014 Accomplishments:			
In FY 2014, LL fabricated the world's lowest power field-programmable gate array (FPGA) for applications that require only modest computing speed with stringent power constraints of tens of microwatts. Additionally, development began on two focal-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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plane array technologies that provide highly flexible processing and high-sensitivity detection at visible and long-wave infrared wavelengths. Integrated photonics were designed for several applications, including more capable and lower size/weight/cost free-space laser communications.

FY 2015 Plans:

The low-power FPGA work will be completed and transitioned into demonstrations. The first fabrication of new visible and long-wave infrared focal plane arrays will be completed and a third type of imager will be pursued, based on charge-coupled devices (CCDs) made in germanium for multi-megapixel, short-wave infrared imaging. The germanium CCD development will benefit from years of development of record-performance silicon CCDs at Lincoln Laboratory and will build on recent advances in germanium material, particularly in large wafer formats. Additionally, the integrated photonics efforts will continue with a focus on both laser communications and chemical sensing applications. Finally, two new efforts will include transistor development in diamond for high power, high frequency radar, electronic warfare and communication applications; and the development of new micro-fluidic actuators based on super-capacitor technology for robotics and biomedical applications.

FY 2016 Plans:

The development of focal plane arrays, integrated photonics, emerging electronic components and microfluidics will continue. In FY 2016, the array size and performance of the advanced focal plane arrays is expected to reach a level suitable for demonstrations of a number of new applications. In particular, the advanced visible imagers will enable large-format, low-light-level imaging from fast moving, unstable platforms and the long-wave infrared focal planes will support wide-area persistent surveillance at night using thermal imaging from small, low-cost platforms. Support for work in diamond is expected to expand to include diamond heat spreaders (to cool high-power gallium nitride electronics and high power laser diodes) and for quantum sensing.

Title: Optical Systems and Technologies	5.460	6.900	7.399
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Description: This project develops focal planes, integrated imagers, laser communication technology, imaging and spectroscopic systems.

FY 2014 Accomplishments:

Coherent combining of optical fields for imaging and laser systems was a major focus area. In particular, Lincoln Laboratory developed interferometric techniques for high-resolution imaging of satellites in geosynchronous orbit from a ground station and for high-resolution imaging of the Earth from a spacecraft. The interferometric imager work includes the development of new algorithms and the development of methods to mechanically support the apertures, measure the atmospheric phase aberrations, and apply phase corrections to each aperture. Additionally, advances in coherent combining of lasers were extended, for the first time, to quantum cascade lasers operating in the mid-wave infrared, with applications to infrared countermeasures and active hyperspectral imaging. Third, new computational imaging architectures were developed that leverage the capabilities

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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of specialized focal plane arrays as a means to further improve performance. Finally, a new effort was initiated to develop a coherent focal plane array, which will enable wide area imaging of motion and vibration.

FY 2015 Plans:

Several efforts, including the ground-based interferometric imaging and the coherent combining of mid- and long-wave infrared lasers, will perform key demonstrations to enable follow-on transition efforts. The space-based interferometric imaging and computational imaging projects will be performing more advanced laboratory experiments. Based on techniques developed for interferometric imaging, a new effort will begin exploring digital algorithms for coherently combining laser communication receivers. Additionally, an underwater laser communication system will be developed and will be tested at a Naval Undersea Warfare Center site. A modest-sized version of the coherent focal plane array will be fabricated and configured for testing as an advanced hyperspectral imager. Several small efforts will explore new approaches to remote magnetometry for submerged target detection and remote surface characterization.

FY 2016 Plans:

The space-based interferometric imaging and the undersea laser communication system development efforts will demonstrate key performance metrics that are relevant to future systems. The laboratory experiments related to the coherent focal plane array and the computational imaging systems will advance beyond initial demonstration and characterization to more application-focused experiments. Finally, as the limitations of the new remote magnetometry-based target detection and remote surface characterization are understood, more advanced laboratory experiments and demonstrations will be performed.

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 2014 Accomplishments:

In FY 2014, final development of a cubesat with an integrated microwave radiometer was completed and the satellite was launched on July 13, 2014. Based on this initial cubesat, future nano-satellite development efforts for weather sensing have successfully transitioned to externally sponsored programs. Methods for further extending the linearity of radio frequency receivers were investigated using a technique called time-varying quantization, which can remove nonlinearities in the analog-to-digital conversion step. Techniques to improve antennas by making them conformal and by making smaller antennas with wider bandwidths were also developed. Finally, techniques to use integrated photonics to improve the bandwidth of simultaneous transmit and receive (STAR) systems were explored.

FY 2015 Plans:

Final testing of the low-power, high-linearity integrated receiver chip will be performed early in FY 2015 and this technology is expected to be transitioned to the Navy and potentially to other sponsors. As this project concludes, two new radio frequency (RF) integrated circuit efforts will be initiated: the development of miniature RF circuits integrated on chips with photovoltaic cells and

	2.987	3.209	3.639

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<p>batteries in a very thin, flexible form factor; and gallium nitride on silicon technology will be advanced to enable large, high-power, low-cost/scalable RF arrays for radar, communication and electronic warfare applications. Efforts to develop RF photonics will focus on developing a low noise figure, broadband amplifier that can support both remote antenna installations and can serve as the front-end for the more complex, integrated-photonics-based processing approaches that have previously been investigated. This low-noise-figure amplifier will use recently developed advances in high-power diode lasers, high-speed modulators and high-power photodetectors. New technology to integrate simultaneous transmit and receive (STAR) capabilities at the element level in phased arrays will also be developed. Finally, a number of RF communication efforts will be aimed at enabling networking in contested environments, providing higher-security RF waveforms and using compressed sensing techniques to create more advanced, low-cost receiver capabilities.</p> <p>FY 2016 Plans: Advances in the new integrated circuit efforts will continue, including progress towards higher performance components, better thermal management for high-power applications and more advanced demonstrations. Several efforts including the element-level simultaneous transmit and receive technology and the low-noise-figure RF photonic amplifier will begin key laboratory demonstrations. Finally, research of communication technologies will continue, with the higher-security RF waveforms likely to be ready for transition.</p>			
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Title: Information, Computation, and Exploitation Sciences	4.556	5.684	6.336
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Description: This project seeks to develop novel architectures, tools, and techniques for the processing, fusion, interpretation, computation, and exploitation of multi-sensor, multi-intelligence data.

FY 2014 Accomplishments:

Lincoln Laboratory developed techniques for processing large data sets, which include new efforts to compute on masked data and optimized analysis of large cyber, social media, and biological data sets. These techniques continue to be adopted by the intelligence community and other organizations that need to perform complex analysis of large and rapidly expanding data sets. Graph analytics techniques and bounds for network discovery were developed. A new hardware development effort was initiated to demonstrate a scalable architecture specifically optimized for graph analytics. Additionally, new analytics were developed for applications including multi-intelligence fusion of uncooperatively collected audio and visual datasets, customizable pattern analytics, analysis of satellite imagery, and more efficient change detection in synthetic aperture radar collections.

FY 2015 Plans:

The 'big data' effort will continue to advance in several ways, including further development of techniques for computing on masked data, the addition of new security tools, the integration of social media analysis with denser data sets and the expansion of capabilities to process large sensor-derived data sets. The graph processing efforts will move from the design and simulation stage to prototyping and demonstration. Finally, new techniques that were previously developed as part of individual analysis tools will be more tightly integrated into efforts aimed at (1) providing adaptive and interactive analytic capabilities, (2)

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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>	Project (Number/Name) P534 / <i>Lincoln Laboratory</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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instrumenting and measuring how humans interact with these tools, and (3) integrating together tools that simulate and optimize the performance of algorithms on different hardware platforms.

FY 2016 Plans:
Continued advances will be pursued in the area of big data with an emphasis on the fusion of multiple types of data and more secure processing of this information. Additionally, more advanced demonstrations of new graph analysis tools, algorithms and processing architectures will be performed with an emphasis on relevant applications such as cyber security and hidden network detection. Finally, improved techniques for optimizing the way that analysis tools work with human analysts will be developed and the underlying algorithms will be better designed to use the capabilities of specialized processing platforms.

Title: Cyber Security	3.597	4.282	4.520
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Description: Cyber Security develops technologies and new techniques for the protection of systems against cyber attack and exploitation.

FY 2014 Accomplishments:
The FY 2014 efforts included better approaches to protect systems and better tools to understand cyber vulnerabilities and exploitation strategies. Most of the system protection work was focused on cloud computing systems, including better techniques for protecting information storage and sharing in commercial cloud systems, new functional encryption techniques, and a private cloud testbed that was used to develop new technologies for future DoD and US government dedicated cloud systems. Additionally, a smaller effort was aimed at developing more secure processors that only require the data and operating instructions to be decrypted for a short period of time, in a very limited part of the processor, to limit vulnerabilities. Efforts aimed at understanding cyber vulnerabilities and exploitation strategies included the development of tools aimed at both small and large-scale systems. At the device level, a portfolio of widely applicable tools were developed for low-level reverse engineering of software and hardware. At the system level, tools for obtaining situational awareness of cyber protections, vulnerabilities and the history of a network were developed and deployed, both on the MIT Lincoln Laboratory network and more recently to DoD computer networks.

FY 2015 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 further advancing the private cloud testbed for developing a DoD-relevant architecture and there will be some additional work on functional encryption techniques. Additionally, the secure processor effort will be expanded and will be aimed toward transitioning to an externally-funded program. On the vulnerability evaluation side, the well-developed reverse engineering tool set will be used to create a new tool for constructing large corpora of realistic vulnerabilities, which is presently an important limitation for research into software vulnerabilities. The network cyber situational

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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awareness tools will continue to be transitioned to external networks and, in its place, a new effort will develop methods for characterizing and emulating hardware vulnerabilities, starting with malicious circuits in computer processors.

FY 2016 Plans:

Efforts will continue to develop the new architecture for secure cloud computing and an operational secure cloud system will be demonstrated and tested. The research on functional encryption and secure processors will also move toward advanced demonstrations. Finally, the tools for generating and emulating both software and hardware vulnerabilities will be expanded. For example, the hardware vulnerability effort will move beyond just computer processors to exploring vulnerabilities in peripheral devices, such as network controllers.

Title: Biomedical Sciences and Technology

Description: The Biomedical Sciences and Technology 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 2014 Accomplishments:

In the area of brain and cognitive sciences, award-winning techniques were developed for detecting depression and neurological disorders from vocal biomarkers and models were developed to understand the link between cognitive state and speech production. In the synthetic biology area, tools and techniques were developed to engineer new genetic codes and a 100-plex microfluidic module was built to test genetic code design. Third, to better understand physical injury and performance, several approaches were pursued. These included the world's first demonstration of ultrasound excitation and measurement using remote optical techniques. Finally, a number of biomarkers and epigenomic markers were measured and combined with other data to get a more complete understanding of performance, health, and recovery from injury. One project explored these correlations in humans for studying cognitive readiness while another studied the epigenomic landscape in mice with musculoskeletal injuries.

FY 2015 Plans:

The brain and cognitive sciences projects are expanding with new projects in mapping the functional connectivity of the brain and developing a non-invasive brain-computer interface for cognitive assessment. Both of these efforts will build on continued advancements in understanding the brain basis for speech with neurological disorders in order to develop better rehabilitation and learning strategies. Based on the successful transition of some of the past synthetic biology efforts to external programs, a new effort in FY 2015 will be aimed at three-dimensional (3D) printing of a mouse colon model that will serve as an artificial environment to co-culture and study engineered microbes. Finally, the physical injury and performance focus area will continue to develop a more advanced opto-acoustic imaging system with the goal of transitioning this work to an external sponsor. This area will also continue to advance techniques for correlated measurements of cognitive performance in humans, while focusing more on DoD-relevant problems and the predictive capabilities of this approach.

FY 2016 Plans:

	3.144	3.817	4.051
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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The three focus areas will continue to be pursued with the brain and cognitive science work focusing on the newer efforts to advance our understanding of the brain and developing methods for interfacing it with computers. Additionally, the new thrust in developing a mouse colon model to culture complex microbial communities will be used to evaluate the effectiveness and competitiveness of engineered microbes in these cultures. Finally, new approaches to predict and impact human performance and to improve recovery from physical injury will continue to be developed.

Title: Autonomous Systems	2.328	2.339	2.964
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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 2014 Accomplishments:

Autonomous system hardware efforts were focused on developing a new optical sensor, primarily for autonomous airborne platforms, and on developing technologies for autonomous undersea operations. The optical sensor development leveraged past investments in photon-counting detector arrays, which are integrated with readout circuits that can perform real-time processing of data. A custom sensor that can aid in autonomous navigation using optical flow and structured optical illumination techniques has been designed and is being fabrication based on this technology. Additionally, undersea testing was performed to study new techniques for obstacle avoidance and close engagement with moving vessels. These undersea tests also included measurements of an undersea power source based on seawater reactions with doped aluminum, which was developed in FY 2013 and is now transitioning to a start-up company for commercialization. Finally, algorithms were developed to improve the extraction of salient information from data for real-time decision making in autonomous systems.

FY 2015 Plans:

The autonomous system hardware efforts will continue and will enter a demonstration phase of development. The fabrication of the optical sensor for autonomous airborne navigation will be completed and the chip will be characterized. New algorithms that leverage the capabilities of this sensor will be further developed and testing of the algorithms on the chip will begin. Additionally, the undersea autonomy effort will focus on the development of models and strategies for control and navigation, particularly in environments with moving vessels. Finally, higher level algorithms for autonomous systems will correlate global positioning system (GPS) data with visual data and use different machine learning algorithms to enable operations in uncertain scenarios.

FY 2016 Plans:

Development of the optical sensor for airborne platforms will be completed and the sensor will be integrated with an unmanned aerial vehicle (UAV) for more advanced testing. The autonomous underwater technology will continue to be developed and the algorithms for control and navigation will be tested. Finally, the development of autonomy algorithms will explore ways to place guarantees on behavior and to enable new performance capabilities.

Title: Quantum System Sciences	3.592	4.108	4.647
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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Description: Quantum information sciences to develop basic technologies that support sensing, communication and computation using quantum information. Focus on demonstration of scalable computation platforms, and demonstration of quantum protected communications and magnetic field sensing using highly-compact atomic-like defects in diamond.

FY 2014 Accomplishments:

The quantum system sciences projects include two quantum computing modalities and efforts in both quantum communication and quantum sensing. The quantum computing modalities include superconducting qubits and trapped ions, with both of these efforts focusing on the most forward-looking technology developments in their fields. These developments include record coherence times using scalable, gate-based architectures for superconducting qubits and the development of integrated photonics for scalable arrays of trapped ion qubits. New FY 2014 externally-funded efforts now support important companion technology development in both of these quantum computing modalities. The FY 2014 quantum communication work included theoretical efforts to understand the cryptographic security of quantum protocols and experimental efforts to develop single-photon detectors and entangled / single photon generators that offer record speed and efficiency. Finally, ensembles of nitrogen vacancies (atomic-like defects) in diamond were operated in a new geometry based on total internal reflection within the diamond to achieve the highest magnetic field sensitivity yet demonstrated for a diamond-based magnetometer. All of these quantum sciences efforts are closely connected to work on MIT campus through collaborations that involve both the MIT faculty, who are world-experts in these fields, as well as their graduate students who work collaboratively in both locations. As part of this collaboration, a 40-kilometer-long dark fiber link was established between MIT campus and MIT Lincoln Laboratory to enable future quantum communication demonstrations.

FY 2015 Plans:

The same quantum modalities will continue to be pursued with an evolving focus for several of the projects. The superconducting qubit work will continue to advance the state-of-the-art for the superconducting qubits themselves, particularly for long-term, gate-based quantum computing architectures, to complement external programs that support the development of superconducting circuits, control, packaging and adiabatic quantum computing architectures. The trapped ion work will continue to support integrated photonics for more scalable systems and will develop gallium-nitrite-based waveguides and modulators suitable for the wide range of wavelengths necessary to address the ions, these broadband optical devices will also be suitable for classical applications, including undersea imaging and communications. The quantum communication work will move towards improving a new protocol for high-rate, quantum-protected communication that avoids the need for a separate, slow key exchange step. Finally, the diamond magnetometer work will move from single axis measurements to full vector measurements and will adapt protocols from other quantum modalities to further increase the sensitivity of the sensor. Efforts to connect with MIT campus will be further strengthened and quantum communication protocols will be implemented over the fiber link.

FY 2016 Plans:

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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>	Project (Number/Name) P534 / <i>Lincoln Laboratory</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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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	1.000	1.200	1.800
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Description: This project develops nanoscale materials and new materials to support high-resolution, multi-material additive manufacturing

FY 2014 Accomplishments:

Lincoln Laboratory imbedded active elements into both optical and radio frequency meta-materials to produce electrically tuned filters. Additionally, graphene, a two-dimensional material, was combined with plasmonic structures to act as optical limiters for focal plane arrays. This work was successfully transitioned into a separate program for further development. Finally, a new effort was initiated to develop low-loss polymer and metal materials that can be used in high-resolution additive manufacturing to print 3D high-performance conductive and dielectric materials.

FY 2015 Plans:

The effort to develop conductive and dielectric materials for additive manufacturing will be expanded and techniques for printing these materials in 3D will be developed in collaboration with Harvard University. The properties of radio frequency devices that are printed using these materials will be characterized and the materials will be further optimized. Additionally, a new effort in atomically-thin materials will focus on characterizing transition metal dichalcogenide materials to investigate the potential for using these devices in electronic, photonic, and sensing devices.

FY 2016 Plans:

Both the additive manufacturing and atomically-thin materials efforts will increasingly focus on device fabrication and characterization. The atomically-thin materials effort will focus on demonstrating electronic and optoelectronic properties that cannot be achieved from conventional materials, such as those based on the unique spin properties of transition metal dichalcogenides. The additive manufacturing materials effort will focus on developing microwave components that are suitable for emerging high-frequency bands. These devices can incorporate features that are not possible using subtractive machining and other traditional fabrication techniques, in order to enable lower-cost, more compact and higher performance microwave and millimeter wave systems.

Accomplishments/Planned Programs Subtotals	31.859	37.792	42.078
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C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 2	PE 0602234D8Z / <i>Lincoln Laboratory</i>	P534 / <i>Lincoln Laboratory</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P535: <i>Technical Intelligence</i>	6.950	8.284	10.015	8.948	-	8.948	9.440	5.687	6.584	6.672	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 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. Another set of products is tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Technical Intelligence	8.284	10.015	8.948
<p>Description: The Technical Intelligence Program provides global science and technology (S&T) awareness and context in order to assist Defense decision-makers 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. Another set of products is tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies.</p>			
<p>FY 2014 Accomplishments:</p> <p>In FY 2014, the Technical Intelligence program focused on programs which supported the characterization of today's global S&T environment, exploitation of novel TW/HS tools to identify nascent and disruptive technologies that will shape tomorrow's future, and the development of tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically:</p> <ul style="list-style-type: none"> • JASON Program: Led efforts to award the new JASON Program contract – First time in 25 years. In addition, sponsored two JASON studies on national security topics: Artic Over the Horizon Radar (OTHR) and Millimeter Wave (MMW) Frequencies. Additional information on this effort is at a higher classification level. • Morning Express Program: Sponsored the development of a countermeasure system to protect forces and infrastructure from attack. Additional information on this effort is at a higher classification level. • Theories of Emergence Program: Sponsored a collaborative academic research effort to address the scientific basis behind predicting and detecting emerging S&T. The goal of these basic research efforts was to develop quantitative, theory-based approaches that increase the accuracy and effectiveness of predictive intelligence over time. • Technical Assessment Program: Sponsored multiple technical assessment activities to include a collaborative Synthetic Biology Challenge and technical assessments (printed Electronics, Quantum Magnetometry, and Autonomy). 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>	Project (Number/Name) P535 / <i>Technical Intelligence</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>• Open-Source Capability Development: Sponsored the development of a contemporary website based on the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)) S&T News Bulletin, which showcased S&T news stories and academic publications.</p> <p><i>FY 2015 Plans:</i> In FY 2015, the Technical Intelligence program continues to support efforts that characterize today's global S&T environment, exploit novel TW/HS tools to identify nascent and disruptive technologies that shape tomorrow's future, and develop tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically:</p> <ul style="list-style-type: none"> • JASON Program: Office of Technical Intelligence (OTI) sponsors the JASON group to support focused technical assessments on defense relevant problems. The topic areas include: Defense against Hypersonics, Science-Based Explosive Design, and Impacts of Emerging Biological Capabilities. • Technology Watch and Horizon Scanning (TW/HS) Tool Exploitation: OTI sponsors 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 on how to incorporate private-sector data analysis regarding technology development, trends, and potentially disruptive developments. • Technical Assessment Program: OTI sponsors multiple technical assessment activities that include human-systems integration and interface, autonomy and technology forecasting. <p><i>FY 2016 Plans:</i> In FY 2016, the Technical Intelligence program will continue to support efforts that will characterize today's global S&T environment, exploit of novel TW/HS tools to identify nascent and disruptive technologies that will shape tomorrow's future, and develop tailored technical assessments that identify the military relevance, research opportunities, and policy recommendations of emerging and disruptive technologies. Specifically:</p> <ul style="list-style-type: none"> • JASON Program: OTI will sponsor the JASON group to support focused technical assessments on defense relevant problems. The topic areas will 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: OTI will sponsor efforts on exploiting data analysis and TW/HS tools, to identify existing and unrecognized patterns, to provide non-obvious relationships using open source information. • Technical Assessment Program: OTI will sponsor multiple technical assessment activities that will support the community of interest topic areas, and may include cognitive neuroscience, optics and directed energy, and energy storage capture and storage. 			
Accomplishments/Planned Programs Subtotals	8.284	10.015	8.948

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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602234D8Z / <i>Lincoln Laboratory</i>	Project (Number/Name) P535 / <i>Technical Intelligence</i>
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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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602234D8Z / Lincoln Laboratory				Project (Number/Name) P536 / Testbed for Comparative Analysis			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P536: Testbed for Comparative Analysis	3.206	0.326	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Testbed for Comparative Analysis program supports the Technical Watch and Horizon Scanning (TW/HS) efforts within the Office of Technical Intelligence (OTI). The TW/HS program identifies nascent and disruptive technologies that will shape the future science and technology (S&T) landscape through the exploitation of novel TW/HS tools. The Testbed for Comparative Analysis program provides OTI the ability to quantitatively and qualitatively test and evaluate techniques for technology forecasting and horizon scanning.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Testbed for Comparative Analysis	0.326	-	-
Description: The Testbed for Comparative Analysis program supports the Technical Watch and Horizon Scanning (TW/HS) efforts within the Office of Technical Intelligence (OTI). The TW/HS program identifies nascent and disruptive technologies that will shape the future science and technology (S&T) landscape through the exploitation of novel TW/HS tools. The Testbed for Comparative Analysis program provides OTI the ability to quantitatively and qualitatively test and evaluate techniques for technology forecasting and horizon scanning.			
FY 2014 Accomplishments: In FY 2014, the Testbed for Comparative Analysis program supported efforts identifying nascent and disruptive technologies that shape the future science and technology (S&T) landscape through the exploitation of novel TW/HS tools. Specifically: • TW/HS Pilot System Development: Sponsored efforts to develop an autonomous TW/HS prototype operating system, which may provide early identification of emerging and developing technologies.			
Accomplishments/Planned Programs Subtotals	0.326	-	-

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 2: <i>Applied Research</i>	R-1 Program Element (Number/Name) PE 0602251D8Z I <i>Applied Research for the Advancement of S&T Priorities</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	33.543	41.905	48.226	-	48.226	48.088	53.039	56.873	57.602	Continuing	Continuing
P227: <i>Applied Research for the Advancement of S&T Priorities</i>	-	33.543	41.905	48.226	-	48.226	48.088	53.039	56.873	57.602	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 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 necessary support to the S&T Communities of Interest.

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	37.984	41.965	46.920	-	46.920
Current President's Budget	33.543	41.905	48.226	-	48.226
Total Adjustments	-4.441	-0.060	1.306	-	1.306
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.218	-			
• SBIR/STTR Transfer	-1.223	-			
• FFRDC Sec 8104	-	-0.060	-	-	-
• Economic Assumptions	-	-	-0.117	-	-0.117
• Realignment for Higher Priority Programs	-	-	1.423	-	1.423

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602251D8Z / <i>Applied Research for the Advancement of S&T Priorities</i>				Project (Number/Name) P227 / <i>Applied Research for the Advancement of S&T Priorities</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P227: Applied Research for the Advancement of S&T Priorities</i>	-	33.543	41.905	48.226	-	48.226	48.088	53.039	56.873	57.602	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 necessary support to the S&T Communities of Interest.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Applied Research for the Advancement of S&T Priorities	17.267	24.349	25.000
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, and Cybersecurity.			
FY 2014 Accomplishments: Conducted concept exploration efforts that focused on ERS, Autonomy, and D2D. Accomplishments within the areas included:			
ERS:			
- Extended ERS architecture development and established baseline knowledge management environment			
- Developed advanced large data analysis and visualization capabilities			
- Furthered ERS Tradespace capabilities through more comprehensive capture of workflow processes			
- Developed ERS cloud-computing environment			
Autonomy:			
- Developed scenarios and requirements for sample mission types			
- Designed audio anomaly detector hardware and supporting algorithms			
- Completed early implementation of a goal reasoning model (Goal-Directed Autonomy) to provide an autonomous squad member the ability to self-select new goals when it encounters an unanticipated situation			
- Developed predictive models of operator trust, understanding, and overload			
- Developed multi-scale approaches to assessing confidence in human performance			
- Completed a Tactical Battle Manager architecture definition and implementation			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602251D8Z / <i>Applied Research for the Advancement of S&T Priorities</i>	Project (Number/Name) P227 / <i>Applied Research for the Advancement of S&T Priorities</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>D2D:</p> <ul style="list-style-type: none"> - Performed live collection of wide area motion imagery data and detected anomalous events automatically - Improved automatic threat assessment accuracy by 20 percent - Improved tracking results from imagery by 30 percent <p>FY 2015 Plans: Continue efforts within the ERS, Autonomy, and D2D areas. Plans are:</p> <p>ERS:</p> <ul style="list-style-type: none"> - Release Version 1.1 and 1.2 ERS Architecture - Develop lifecycle cost models that address the entire life of Air Force unmanned platforms - Improve visualization and automated tradespace reduction techniques - Use hi-fidelity, high-performance computing simulations to examine rotor blade performance on cargo rotorcraft - Create a standard modeling library for the retention and use of UH-60 helicopter data - Launch second release of ERS Knowledge Management environment <p>Autonomy:</p> <ul style="list-style-type: none"> - Develop virtual terrain and simulated entities to increase the complexity of autonomous squad behavior - Construct three rotorcraft capable of autonomous and stable flight; demonstrate in simulation the software to perform mapping, task allocation, trajectory planning, and frontier identification - Validate, refine, and further develop estimators of trust in Autonomy - Demonstrate proof-of-concept Tactical Battle Management in virtual simulation <p>D2D:</p> <ul style="list-style-type: none"> - Integrate live text analytics with signals analysis - Integrate target queuing framework from stored text data - Integrate text and signals analysis into cloud architecture - Demonstrate overall system performance <p>FY 2016 Plans: Continue to conduct concept exploration efforts that focus on the S&T priority areas. In FY 2016, the challenge areas within the priorities include:</p> <p>Autonomy:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602251D8Z / <i>Applied Research for the Advancement of S&T Priorities</i>	Project (Number/Name) P227 / <i>Applied Research for the Advancement of S&T Priorities</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 <p>Engineered Resilient Systems:</p> <ul style="list-style-type: none"> - Continue systems analysis methods and tools - Develop early concept engineering techniques - Develop architecture and design analysis techniques - Evaluate new approaches to analysis and testing <p>Data to Decisions:</p> <ul style="list-style-type: none"> - Improve algorithms for data fusion - Improve understanding of user interactions <p>Cyber:</p> <ul style="list-style-type: none"> - Enhance mission assurance and effectiveness - Develop techniques for operating securely in an insecure world - Build upon cyber technology foundations <p>Counter Weapons of Mass Destruction:</p> <ul style="list-style-type: none"> - Continue to assess methods for systems integration - Develop advanced signature detection and tracking techniques - Develop methods of advanced radiation detection 				
<p>Title: S&T Communities of Interest</p> <p>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.</p> <p>FY 2014 Accomplishments: Provided technical support to all seventeen Communities of Interest. In collaboration with Components, initiated eight two-year projects to target technology opportunities and gaps identified by Communities of Interest. Projects initiated were:</p> <ul style="list-style-type: none"> - Reusable Military Launch Concepts 		16.276	17.556	23.226

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602251D8Z / <i>Applied Research for the Advancement of S&T Priorities</i>	Project (Number/Name) P227 / <i>Applied Research for the Advancement of S&T Priorities</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Analysis to Determine the Role of Pedigree-based Training and Licensure in the Certification of DoD's Autonomous Systems - Foundations for Context-aware Information Retrieval for Proactive Decision Support - Integrated SATCOM Tactical Resiliency Risk Reduction - Cyber Operational Architecture Training System - Adaptive Technologies for Language Training - Accelerated Discovery to Delivery - Joint Service Research on Materials By-design and On-demand - Technology Investigation and Assessment for the Development of Digital Read Out Integrated Circuits <p>FY 2015 Plans: Continue to provide technical support to Communities of Interest. Initiate new set of projects to address technology opportunities or gaps identified by Communities of Interest.</p> <p>FY 2016 Plans: Continue to provide technical support to Communities of Interest. Initiate new set of projects to address gaps identified by Communities of Interest.</p>				
Accomplishments/Planned Programs Subtotals		33.543	41.905	48.226
C. Other Program Funding Summary (\$ in Millions)				
N/A				
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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602668D8Z I <i>Cyber Security Research</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	11.637	14.979	13.727	-	13.727	12.966	15.249	15.537	15.748	Continuing	Continuing
P003: <i>Cyber Applied Research</i>	-	11.637	14.979	13.727	-	13.727	12.966	15.249	15.537	15.748	Continuing	Continuing

A. Mission Description and Budget Item Justification

Our military forces require resilient, reliable networks and computer 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, and protect tactical networks, weapons systems and platforms.

This 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. New efforts will also be aligned with emerging U.S. Cyber Command (USCYBERCOM) mission requirements.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	13.907	15.000	15.285	-	15.285
Current President's Budget	11.637	14.979	13.727	-	13.727
Total Adjustments	-2.270	-0.021	-1.558	-	-1.558
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.807	-			
• SBIR/STTR Transfer	-0.463	-			
• FFRDC Sec 8104	-	-0.021	-	-	-
• Realignment for Higher Priority Programs	-	-	-1.516	-	-1.516
• Economic Assumptions	-	-	-0.042	-	-0.042

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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*

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P003: Cyber Applied Research	-	11.637	14.979	13.727	-	13.727	12.966	15.249	15.537	15.748	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 Cyber Community of Interest S&T Roadmap, the 2013 Cyber S&T Capability Gap Framework and other assessments conducted by OASD(R&E). Progress and results are reviewed by the DoD Cyber S&T Community of Interest.

Beginning in FY 2013, the program expanded research in cyber command and control 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, new efforts were aligned with emerging U.S. Cyber Command (USCYBERCOM) mission requirements.

The six technical thrust areas 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 2014	FY 2015	FY 2016
Title: Foundations of Trust	4.295	1.005	1.437
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 2014 Accomplishments:			
- Demonstrated a protection system that can prevent, detect, and respond to supply chain attacks.			
- Demonstrated trusted computing platform with capabilities that can detect and mitigate compromise.			
- Developed techniques to enable continuous measurement and integrity checking of operating system and mission application software during execution.			
FY 2015 Plans:			
- Develop a non-signature based capability to detect malicious code on cyber systems with high accuracy.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602668D8Z / <i>Cyber Security Research</i>	Project (Number/Name) P003 / <i>Cyber Applied Research</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Develop detection algorithms for malicious Universal Serial Bus (USB) firmware/hardware. - Conduct theoretical Graphics Processing Unit (GPU) image processing research and conduct experimentation on production Scanning Electron Microscope (SEM) data. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Evaluate image processing computation developed in FY 2015 and identify those steps which might benefit from GPU acceleration. - Build a SEM image processing-focused library of GPU tools. 				
<p>Title: Resilient Infrastructure</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Developed verification and monitoring techniques to enhance security of deployed networks. - Developed signal processing approaches and recent network theory advances to detect and predict adversary activities in networks. - Conducted modeling and simulation that resulted in improved understanding and approaches for resiliency. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Design framework for secure modularization and virtualization of nodes and networks. - Develop methods for increasing resiliency of large scale tactical networks while enabling increased mobility. - Develop cyber resiliency techniques and tools against attacks on known classes of cyber vulnerabilities applicable to Cyber Physical Systems (CPS), and specifically, to hull, mechanical and electrical (HM&E). <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Deploy capabilities on applicable CPS/HM&E systems. - Design and develop capability to monitor and autonomously remove malicious code, commands and data. 		1.295	1.090	0.946
<p>Title: Agile Operations</p> <p>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</p>		2.030	0.500	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602668D8Z / <i>Cyber Security Research</i>	Project (Number/Name) P003 / <i>Cyber Applied Research</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<ul style="list-style-type: none"> - Automated mapping of mission essential functions to cyber resources using multi-attribute identifiers to enable commander's understanding of dependencies. - Improved attack detection and graded response techniques to enhance survivability, attacker attribution, and adversarial deterrence. - Enabled cyber effects assessment. - Developed machine intelligence techniques for autonomous reprogramming, reconfiguration, and control of cyber components. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Develop metrics to support development and maintenance of Computer Network Defense (CND) capabilities to thwart certain classes of Advanced Persistent Threats (APT) and other threats. - Create algorithms to identify and optimally configure critical cyber assets to assure effective missions. - Assess effectiveness of agility mechanisms and moving target techniques against APT. - Validate and extend machine intelligence techniques and theories based on experimental results. - Develop agility metrics and evaluate within test environments to gauge the utility of agility maneuvers and validate ability to defend Offensive Cyber Operations (OCO) architecture. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Develop tools and techniques to assess and control the cyber situation in mission context. - Develop cloud-based defense architecture system. 			
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Title: Cyber Modeling, Simulation & Experimentation (MSE)	0.850	2.262	2.036
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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 modeling, simulation, and experimentation: 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 experiments, providing the ability to track the progress of cyber research investments in a quantitative fashion. This area will explore 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 2014 Accomplishments:

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<ul style="list-style-type: none"> - Created a modeling and simulation (M&S) environment to support large scale cyberspace experiments and predictions that are currently not feasible with emulation/real information system test beds. - Developed methods and tools to automate execution elements to support cyber experimentation. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Develop tools and techniques to automate situational awareness capabilities for large-scale mission-oriented experiments. - Determine relevant metrics to measure progress and improvements that these tools will contribute to the state of art. - Develop a selected set of vignettes and scenarios for combined cyberspace operations (cyber, Electronic-Warfare (EW), communications and network technologies), focusing on blue and red force interactions. - Investigate application of causal workflows to combined cyberspace operations (cyber, EW, communications, and network technologies). - Determine relevant test environments, design connectivity plan. - Instrument primary test bed to support scenario generation and metric assessment. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Continue to develop a selected set of vignettes and scenarios for combined cyberspace operations (cyber, EW, communications, and network technologies) focusing on blue and red force interactions. - Continue to investigate application of causal workflows to combined cyberspace operations (cyber, EW, communications, and network technologies). - Continue to instrument primary test bed to support scenario generation and metric assessment/refinement. - Investigate the dynamic nature of the system and how this can impact the metrics. 			
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Title: Embedded, Mobile & Tactical Environments (EMT)	0.622	4.694	4.798
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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 infrastructures it is of the utmost importance to provide a secure environment where these devices can be effectively utilized, monitored and tracked.

FY 2014 Accomplishments:

- Developed efficient algorithms capable of locating and tracking stationary and mobile emitters to help protect DoD networks from wireless intrusion.

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Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602668D8Z / <i>Cyber Security Research</i>	Project (Number/Name) P003 / <i>Cyber Applied Research</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Developed and tested hardware capable of rapidly providing accurate line of bearing to wireless emitters. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - Design a robust common architecture that enables secure information sharing in a tactical environment. - Develop approaches to detect counterfeit or malicious components in embedded hardware. - Develop mission and threat scenario information, enumerating the threats to the avionics/platform of unmanned aerial systems (UAS). - Inform Analysis of Alternatives for the UAS/ground control mission computer to include full avionics interface/systems. - Complete pilot/operator cognitive task analyses. <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - Identify and characterize Advanced Persistent Threats (APT) to UAS platform avionics. - Develop techniques to mitigate mission-deviant behavior directed by potential APT presence. - Build and demonstrate situational awareness of the platform's cyber health to UAS pilots/operators and mission commanders. - Develop prototype mission computer design suitable for application across a broad set of military and commercial/open bus architectures. 			
Accomplishments/Planned Programs Subtotals	11.637	14.979	13.727

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u> <u>Continuing</u>
• BA 3, PE # 0603668D8Z, P113: <i>Cyber Advanced Technology Development</i>	11.150	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602670D8Z I <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing
P270: <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Office of the Secretary of Defense (OSD) Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. The program exists to optimize United States (U.S.) forces' ability to perform population-centric sensing, understand behaviors driven by social and cultural variables, and select effective courses of action in the full range of military operations. Program research will enhance population-centric intelligence, surveillance, and reconnaissance (ISR) capabilities for understanding the increasingly complex global environment to address national strategic challenges such as instability, aggression, proliferation of weapons of mass destruction, and violent extremism. In three integrated program elements (PE), the program will conduct applied research, mature and demonstrate advanced technology, and develop transitionable methods, technology, tools, and prototypes. Work under PE 0602670D8Z will focus on developing an applied science base, to include validated theory and methods, along with knowledge products and resources to support sociocultural behavior data collection, analysis and forecasting of sociocultural behavior, course of action planning, and effects analysis. Research will address needs in two areas: modeling and data. It will develop and validate theoretical constructions, generate knowledge products, and develop stand-alone computational models of sociocultural behavior; and improve methods for collecting data that will facilitate model development and enhance forecasting and analysis capabilities. The program will ensure that supported research is clearly tied to warfighters and their needs.

Human behavior based theory, knowledge products, and stand-alone models will support development of software to help users represent, understand, and forecast sociocultural behavior at strategic, operational, and tactical levels.

Improved data collection methods will help build the sociocultural science base, facilitate subsequent model development and validation, and address emerging data types and sources.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602670D8Z I <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	2.000	-	-	-	-
Current President's Budget	2.000	-	-	-	-
Total Adjustments	-	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 2					R-1 Program Element (Number/Name) PE 0602670D8Z / Human Social Culture Behavior (HSCB) Modeling Applied Research				Project (Number/Name) P270 / Human Social Culture Behavior (HSCB) Modeling Applied Research			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P270: Human Social Culture Behavior (HSCB) Modeling Applied Research	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Office of the Secretary of Defense (OSD) Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. The Program exists to optimize United States (U.S.) forces' ability to perform population-centric sensing, understand behaviors driven by social and cultural variables, and select effective courses of action in the full range of military operations. Program research will enhance population-centric intelligence, surveillance, and reconnaissance (ISR) capabilities for understanding the increasingly complex global environment to address national strategic challenges such as instability, aggression, proliferation of weapons of mass destruction, and violent extremism. In three integrated program elements (PEs), the Program will conduct applied research, mature and demonstrate advanced technology, and develop transitionable methods, technology, tools, and prototypes. Work under PE 0602670D8Z will focus on developing an applied science base, to include validated theory and methods, along with knowledge products and resources to support sociocultural behavior data collection, analysis and forecasting of sociocultural behavior, course of action planning, and effects analysis. Research will address needs in two areas: modeling and data. It will develop and validate theoretical constructions, generate knowledge products, and develop stand-alone computational models of sociocultural behavior; and improve methods for collecting data that will facilitate model development and enhance forecasting and analysis capabilities. The Program will ensure that supported research is clearly tied to warfighters and their needs.

Human behavior based theory, knowledge products, and stand-alone models will support development of software to help users represent, understand, and forecast sociocultural behavior at strategic, operational, and tactical levels.

Improved data collection methods will help build the sociocultural science base, facilitate subsequent model development and validation, and address emerging data types and sources.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Human Behavior Based Theory and Model Development	1.000	-	-
Description: The Human Behavior Based Theory and Model Development conducts the research necessary to develop and refine theoretical constructs and validate them using empirical data. Develop knowledge products including conceptual models, decision frameworks, and ontologies that will support population-centric sensing. Apply validation techniques to quantitative models of sociocultural factors in coalition warfare and sociocultural factors of military significance for emerging conflicts. Develop stand-alone models that instantiate social science theoretical constructs to address mission-specific needs to support population centric sensing and warning.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	Project (Number/Name) P270 / <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i> Developed “Big Data” modeling and analysis tools that support construction of intelligence-driven operational views providing decision makers with the ability to make better decisions faster. Social, broadcast, and print media data sources can be used to identify “tripwires” that indicate adversarial activity, including non-State actors/terrorists and criminal organizations. Developed understanding of how sociocultural data can be exploited to provide insight into countering use and proliferation of weapons of mass destruction.</p>			
<p><i>Title:</i> Data Collection Methods</p> <p><i>Description:</i> The Data Collection Methods develop scientifically validated strategies to collect cultural and societal information in denied or difficult to penetrate areas. Develop methodologies and supporting technologies capable of extracting relevant data into databases for further modeling to support denied, restricted, or unavailable area sociocultural data. Develop technologies capable of leveraging extracted data, and processing and validating it, with a particular focus on data from social media.</p> <p><i>FY 2014 Accomplishments:</i> Developed data collection tools that allow analysts to quickly aggregate information based on model output recommendations (“tripwires”). These tools allow easy aggregation of information including people of international interest infrastructure documentation, and data from physical sensors.</p>	1.000	-	-
Accomplishments/Planned Programs Subtotals	2.000	-	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• PE 0603670D8Z BA 3: <i>HSCB Advanced Development</i>	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing
• PE 0604670D8Z BA 4: <i>HSCB Research and Engineering</i>	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>	Project (Number/Name) P270 / <i>Human Social Culture Behavior (HSCB) Modeling Applied Research</i>

E. Performance Metrics N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 2: Applied Research</i>					R-1 Program Element (Number/Name) PE 0602751D8Z I <i>Software Engineering Institute (SEI) Applied Research</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	10.699	9.143	8.824	-	8.824	8.961	9.471	10.262	10.401	Continuing	Continuing
P278: <i>Software Engineering Institute (SEI) Applied Research</i>	-	10.699	9.143	8.824	-	8.824	8.961	9.471	10.262	10.401	Continuing	Continuing

A. Mission Description and Budget Item Justification

Software is a key to meeting the 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 SEI Applied Research PE will develop and evaluate 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 Department through Reliance 21, the overarching framework of the DoD's Science & Technology (S&T) joint planning and coordination process. This PE directly benefits these DoD S&T Communities of Interest (COI): Command, Control, Communications, Computers, and Intelligence (C4I); Autonomy; Cyber; and Engineered Resilient Systems. Additionally, this PE benefits every COI to some degree due to the ubiquitous nature of software. 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 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	11.106	9.156	9.158	-	9.158
Current President's Budget	10.699	9.143	8.824	-	8.824
Total Adjustments	-0.407	-0.013	-0.334	-	-0.334
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.001	-			
• SBIR/STTR Transfer	-0.406	-			
• FFRDC Sec 8104	-	-0.013	-	-	-
• Realignment for Higher Priority Programs	-	-	-0.309	-	-0.309
• Economic Assumptions	-	-	-0.025	-	-0.025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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*

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602751D8Z / <i>Software Engineering Institute (SEI) Applied Research</i>	Project (Number/Name) P278 / <i>Software Engineering Institute (SEI) Applied Research</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To	Total
											Complete	Cost
<i>P278: Software Engineering Institute (SEI) Applied Research</i>	-	10.699	9.143	8.824	-	8.824	8.961	9.471	10.262	10.401	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 Program Element (PE) has four main research thrusts: (1) measurement techniques for the effectiveness of software technologies and methods; (2) design principles and tools for evolvable, scalable ecosystems; (3) models of computational behaviors; and (4) cyber-tradecraft and analytics. 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 also 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 2014	FY 2015	FY 2016
Title: Software Engineering Institute Applied Research	10.699	9.143	8.824
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 to retain a long-term differential advantage over potential adversaries in the area of software-intensive systems. The four main thrust areas are: 1) Measurement techniques for the effectiveness of software technologies and methods. Modern tools, integrated development environments, and software engineering processes have captured large data sets about development activities. This thrust seeks to study the metrics that affect cost, schedule, quality, and performance based on real-world observation and experiment. 2) Design principles and tools for evolvable, scalable ecosystems. The commercial world has many successful examples of software ecosystems, but the DoD has not capitalized on these to the same extent. This thrust looks beyond implementing ecosystems in a DoD context and seeks to implement the underlying principles in a way that makes automated creation, evolution, and scaling of ecosystems easier.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602751D8Z / <i>Software Engineering Institute (SEI) Applied Research</i>	Project (Number/Name) P278 / <i>Software Engineering Institute (SEI) Applied Research</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>3) Models of Computational Behaviors. System performance depends on end-to-end models of computational behavior that include the user, architecture, source and object code, firmware components, and processor hardware. This thrust seeks to study emerging ideas that better model end-to-end computational behavior.</p> <p>4) Cyber-tradecraft and analytics. Cyberwarfare is an increasingly important and rapidly evolving dimension on the modern battlefield. This thrust seeks to investigate methods that will give the DoD enduring advantages in the cyber battlespace such as reverse software engineering, automated code and malware analysis, code-level software resiliency (e.g., randomizing and time variant techniques), and other techniques such as those found in the Software Security Assurance State-of-the-Art Report.</p> <p>The SEI Applied Research PE will also 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Piloted advanced methods to provide proactive cost control for major space domain systems, pre-milestone A, by better identifying future program change drivers that will impact cost. • Developed automated verification support for distributed algorithms, to lower costs of complex systems and increase assurance when testing might not be possible. Established education and training opportunities with the Air Force Research Laboratory. • Developed new analysis for verifying the safety of software used to control cyber-physical systems in cooperation with the U.S. Army Communications-Electronics Research, Development and Engineering Center and the Federal Aviation Administration. • Developed a simulation model to reveal the cost of software sustainment for major systems and serve as a decision aid for investments. Model trialed with a Navy Laboratory. • Developed an insider threat detection test bed that delivers more effective insider threat controls for the DoD. • Developed and demonstrated novel vulnerability discovery techniques for supervisory control and data acquisition systems, regardless of access to source code. • Validated scalable, efficient malware analysis techniques in operational environments that expand the available threat indicators and reduce response time. • Improved the efficiency of error detection by demonstrating that an architecture fault model with confidence arguments can diagnose an error and validate a solution. Piloted this approach with an engine control system developed by industry for the DoD. • Deployed prototypes for social network analysis to the National Guard, proving a lightweight, effective, and predictive capability to augment preparation and response to natural or man-made disasters during large public events. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602751D8Z / <i>Software Engineering Institute (SEI) Applied Research</i>	Project (Number/Name) P278 / <i>Software Engineering Institute (SEI) Applied Research</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>• International Organization for Standardization (ISO) published the SEI led effort ISO/International Electro-technical Commission Technical Specification 17961:2013 “C secure coding rules” which were developed in the second edition of the CERT C Coding Standards book. Multiple Defense Industrial Base entities mandated the book as a development standard.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Improve software security throughout the entire DoD supply chain with increased adoption of secure coding standards, improved security of programming language standards through completion of the CERT C++ Secure Coding Standard (a programming language used in major weapons systems such as the Joint Strike Fighter), reduction of rule violations in interactive development environments, and demonstration of the costs of producing secure code. • Improve approaches to the detection, mitigation and quantification of cyber threats to the DoD, including application programming interface design, automation of static analysis of malware binaries and analysis and contextualization of malware. • Identify ways to better integrate user-friendly Insider Threat controls and monitoring. • Develop software techniques and tools to provide proactive cost control for the sustainment of major systems. • Develop technologies, methods and science to assess individual and team performance during exercises for cyber mission teams. • Develop automated verification algorithms and tools for distributed-adaptive real-time systems, such as unmanned systems, to assure correct behavior and provide confidence in system performance. • Develop a suite of automated tools and techniques to reveal and manage technical debt, often the rework consequences of poor software design and development, during software sustainment. • Build on FY 2014 pilot of architecture fault model to automated incremental life cycle assurance that will decrease the cost and time to test critical systems. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Develop and pilot capabilities and techniques that enhance acquisition-related aspects of software-reliant national security systems, focusing on cost effectiveness and lifecycle assurance. Produce quantitative methods and software tools for cost and schedule estimation, investment planning for assured affordability, system performance and scalability behavior, anomaly and insider threat detection in operations, cyber forensic analysis, and workforce education. • Formulate and prototype a software development methodology with supporting tools and techniques that provide software-based capabilities with greater confidence. • Improve situational awareness of cyber key terrain and mission dependence; improve cybersecurity operations and analysis with increased scientific rigor through analysis automation and application of machine learning. Reduce the costs of cyber attack recovery and reconstitution to provide improved mission assurance and resilience. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 2	R-1 Program Element (Number/Name) PE 0602751D8Z / <i>Software Engineering Institute (SEI) Applied Research</i>	Project (Number/Name) P278 / <i>Software Engineering Institute (SEI) Applied Research</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
• Enhance scalability and validity of methods and software support for assessing the training and development of the cyber and software engineering workforce.			
Accomplishments/Planned Programs Subtotals	10.699	9.143	8.824

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• BA 3, PE# 0603781D8Z: <i>Software Engineering Institute (SEI)</i>	18.167	15.754	15.202	-	15.202	15.181	15.653	16.132	16.351	Continuing	Continuing

Remarks
 Together with PE 0603781D8Z, Software Engineering Institute (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 Defense Industrial Base 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603000D8Z / <i>Joint Munitions Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	32.843	19.709	26.650	25.915	-	25.915	25.941	26.001	26.197	26.551	Continuing	Continuing
P002: <i>Insensitive Munitions Advanced Technology</i>	29.129	16.312	19.788	19.229	-	19.229	19.248	19.293	19.446	19.701	Continuing	Continuing
P301: <i>Enabling Fuze Advanced Technology</i>	3.714	3.397	6.862	6.686	-	6.686	6.693	6.708	6.751	6.850	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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603000D8Z <i>I Joint Munitions Advanced Technology</i>
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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 strategic guidance and current shortfalls in weapon systems and as validated by the PEOs and the Service S&T communities. These 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. These 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	20.012	26.688	26.897	-	26.897
Current President's Budget	19.709	26.650	25.915	-	25.915
Total Adjustments	-0.303	-0.038	-0.982	-	-0.982
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.010	-			
• SBIR/STTR Transfer	-0.293	-			
• Realignment for Higher Priority Programs	-	-	-0.908	-	-0.908
• FFRDC SEC 8104	-	-0.038	-	-	-
• Economic Assumptions	-	-	-0.074	-	-0.074

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P002: <i>Insensitive Munitions Advanced Technology</i>	29.129	16.312	19.788	19.229	-	19.229	19.248	19.293	19.446	19.701	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 2014	FY 2015	FY 2016
Title: High Performance Rocket Propulsion (HPP)	3.311	4.086	3.967
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			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / <i>Joint Munitions Advanced Technology</i>	Project (Number/Name) P002 / <i>Insensitive Munitions Advanced Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Loaded seven-inch diameter rocket motor cases with propellant to support baseline IM testing. Integrated components of delivered assets and finalized motor fabrication for testing. Conducted baseline slow cook off and fragment impact IM testing. Received additional rocket motors, prepared and conducted baseline fast cook off and bullet impact IM tests. Integrated IM mitigation technologies and performed final IM testing. - Completed bond line evaluation and demonstrated 30 gallon mix process for a less-reactive high performance propellant. Performed testing of 30 gallon mix properties. Procured rocket motor materials, cast motors, and conducted component testing to validate proof of concept. - Conducted individual IM component testing, integrated into rocket motor case, cast rocket motors for IM testing, and conducted full suite of IM tests with baseline and less reactive propellants. - Prepared, loaded, and conducted IM testing on novel small diameter missile propellant formulation in manufactured motor cases. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct sub-scale bullet and fragment impact demonstration tests and performance evaluation of 50 to 70 pound motors containing an extinguishable rocket propellant. - Complete design and component testing of slow cook-off mitigation device components for HPP rocket motor. - Perform component-level testing to validate component designs for sensor for surface and air-launched systems. - Demonstrate slow cook-off mitigation sensor performance and validate design for surface launched missile applications. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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. 				
<p>Title: Minimum Signature Rocket Propulsion (MSP)</p> <p>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</p>		1.846	2.420	2.342

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / <i>Joint Munitions Advanced Technology</i>	Project (Number/Name) P002 / <i>Insensitive Munitions Advanced Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Conducted IM, structural, and ballistic testing on full-scale demonstrator motor to validate that design meets defined requirements. - Demonstrated reduced sensitivity minimum signature propellant ballistic and IM properties in full-scale test for transition to budget activity (BA) 6.4 Insensitive Munitions Technology Transition Program and insertion into weapon systems. - Designed and integrated mitigation technologies to reduce response to cook-off, bullet, and fragment impact. Conducted propellant characterization and sub-scale IM tests. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Produce 660 kilograms of innovative explosive fill for general purpose bombs to complete full-scale sympathetic reaction testing and lethality testing to validate performance. - Model and design feasible detonation train, scale up novel bomb formulation to 30 gallon mix quantity, partial fill full-scale assets for testing to validate performance. - Conduct bullet impact, fragment impact, and slow cook-off testing with production representative grenade assembly using novel explosive material. - Scale up and conduct small scale tests on novel bomb fill to optimize formulation and select final formulation. Conduct performance testing of fill and initiation study. - Scale up to produce 100 pounds of unique munition fill material to conduct performance and sensitivity testing in generic warhead assemblies. Prepare for full scale IM testing. - Produce 800 pounds of main fill replacement explosive formulation and prepare hardware for loading and testing. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Manufacture motor cases and complete propellant formulation down-select. Conduct case characterization testing, load motors and conduct static firing of motors. - Conduct static motor tests, and fragment impact and slow cook-off tests on representative composite motor cases. 				
Title: Blast and Fragmentation Warheads (BFW)		6.705	7.584	7.397
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,				

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Demonstrated fault tolerant redundant initiation system capable of passing shaped charge jet testing and capable of reliably initiating unique explosive formulation at hot and cold temperatures. - Conducted formulation characterization and initial performance and sensitivity testing using novel explosive for grenade assembly. - Conducted modeling and simulation effort on novel bomb fill to optimize formulation, scaled up best candidates, and filled representative articles for initiation testing and design detonation train for insensitive fill. - Developed computational analysis to apply as a design tool to substantiate the feasibility of meeting IM and performance requirements with less sensitive explosives and other mechanical IM design features in unique warheads. Hardware was fabricated for testing and IM mitigation designs were tested against slow and fast cook-off, fragment impact, sympathetic reaction, and shaped charge jet threats. - Synthesized adequate quantities of a unique munition fill material to conduct small scale mixes for scale-up, detonation velocity, and critical diameter tests. - Demonstrated new form of matter and efficient method of producing new form of energetic crystal with modified properties. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Produce 660 kilogram of innovative explosive fill for general purpose bombs to complete full-scale sympathetic reaction testing to validate performance. - Model and design feasible detonation train, scale up novel bomb formulation to 150 gallon mix quantity, fill full-scale assets for sympathetic reaction testing to validate performance. - Conduct bullet impact, fragment impact, and slow cook-off testing with production representative grenade assembly using novel explosive material. - Scale up and conduct small scale tests on novel bomb fill to optimize formulation and select final formulation. Conduct performance testing of fill and initiation study. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>- Scale up to produce 1000 pounds of unique munition fill material to conduct performance and sensitivity testing in generic warhead assemblies. Prepare for full scale IM testing.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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. - Conduct pressing evaluation study, load, and begin IM testing of main fill replacement explosive formulation. 				
<p>Title: Anti-Armor Warheads (AAW)</p> <p>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 Cookoff, and Sympathetic Reaction / Shaped Charge Jet threats for Medium Caliber Munitions.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Finalized higher velocity munition IM design. Fabricated, loaded, and conducted shock and thermal assessments. - Completed performance validation studies and initial IM testing for two unique energetic materials as a replacement munition booster. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct performance and IM testing on higher velocity munition ID design. - Conduct ballistic assessment and IM testing for two unique energetic materials as a replacement munition booster. - Conduct integration and design efforts with prototype AAW technologies to demonstrate successful IM technologies to mitigate fragment impact responses. 		3.031	3.705	3.596

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Conduct baseline assessment of unique munition system. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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. 				
<p>Title: Gun Propulsion (GP)</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Optimized the propellant formulations, conducted characterization and performance tests on formulations, and conducted small scale engineering ballistic tests on components for use in shoulder fired weapon system. - Conducted baseline cook-off testing of large caliber ammunition item and conducted modeling and simulation to assist in venting design selection and survivability assessment. - Conducted propellant formulation, characterization tests, and small scale bullet and fragment impact testing of large caliber munition item. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct 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. - Produce prototype of large caliber ammunition item with venting and prepare for full scale IM testing. - Conduct component design and manufacturing of large caliber munition item, and conduct performance testing. Integrate propellant formulation and component design to conduct small scale fragment impact testing and slow cookoff test. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Conduct performance and environmental testing on propulsion and warhead for use in shoulder fired weapon systems. - Conduct full scale IM and performance testing of prototype of large caliber ammunition item. 		1.419	1.993	1.927

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Conduct integrated technology testing of large caliber munition item to ready for transition to program of record.			
Accomplishments/Planned Programs Subtotals	16.312	19.788	19.229

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0602000D8Z P000: <i>BA2 Insensitive Munitions</i>	12.288	13.545	13.082	-	13.082	13.106	13.108	13.262	13.442	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- 1) Transitions 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) Projects 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / <i>Joint Munitions Advanced Technology</i>	Project (Number/Name) P301 / <i>Enabling Fuze Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P301: <i>Enabling Fuze Advanced Technology</i>	3.714	3.397	6.862	6.686	-	6.686	6.693	6.708	6.751	6.850	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 2014	FY 2015	FY 2016
Title: Hard Target Fuzing	0.960	1.841	1.561
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Conducted validation experiments on advanced fuze High-G modeling and simulation tools. - Continued to develop survivable modular fuze technology for application into multi-role common miniature munitions with distributed/embedded fuzes. - Used high fidelity modeling and simulation code and test methods for Air Force Quick Reaction Capability (QRC) Penetrator Program. <p>FY 2015 Plans:</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Conduct high speed weapon hard target tests, to include high shock data recorders, to validate High-G fuze models. - Transition survivable modular fuze technology for application into multi-role common miniature munitions with distributed/ embedded fuzes. <p>FY 2016 Plans: Start development of advanced fuze packaging and alternate low-cost media detection sensor for to measure post impact weapon environments.</p>				
<p>Title: Tailorable Effects Fuzing</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Conducted tests of warhead initiation architecture and control technologies into warheads. Specifically, weapons capable of reducing collateral damage will benefit using tailorable effects technologies. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct demonstration tests of warhead initiation and selectable architecture and control technologies in live explosive tests. - Continue to develop component technologies for multi-mode, multipoint sequential timing fuze designs that will improve void counting algorithms and optimize detonation timing. <p>FY 2016 Plans: Conduct weapon demonstration testing of multi-mode, multipoint sequential timing fuze designs against representative target sets.</p>		0.741	1.591	1.644
<p>Title: High Reliability Fuzing</p> <p>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, higher weapon reliability expectations and harsher weapon system operational requirements are dictating the need for higher fuze reliability than available using current technologies.</p>		0.993	1.860	1.820

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i></p> <ul style="list-style-type: none"> - Refined the design, along with increasing level of integration, and test high reliability fuze prototypes that satisfy reliability while maintaining safety by eliminating single-point and common-mode failures. - Demonstrated high reliability miniature fuzes in air-gun testing, that simulate cluster munitions environments, to achieve technology maturity. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - Develop and demonstrate phase two high reliability MEMS fuze technology prototypes: wafer level packaging MEMS safety and arming (S&A) in Guided Mortar round and bomb fuze bellows motors. - Begin 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. <p><i>FY 2016 Plans:</i></p> <p>Conduct laboratory and projectile dispense testing of fuze communication and interface technologies for DPICM to increase reliability with minimal disruption to the dispense event.</p>			
<p><i>Title:</i> Enabling Fuze Technologies</p> <p><i>Description:</i> 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.</p> <p><i>FY 2014 Accomplishments:</i></p> <ul style="list-style-type: none"> - Conducted joint program with Industry to develop sensor technology into bomb fuzing applications. - Began transition from budget activity (BA) 6.2 efforts of advanced, exploitation resistant proximity sensor advanced technology development. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - Conduct air-drop demonstration testing miniature retard and impact sensors. Partner with Industry to transition sensor technology into bomb fuzing applications. - Conduct testing of advanced, exploitation resistant proximity sensor advanced technology development. <p><i>FY 2016 Plans:</i></p> <p>Complete projectile firing testing of advanced, exploitation resistant proximity sensors against representative target sets.</p>	0.703	1.570	1.661
Accomplishments/Planned Programs Subtotals	3.397	6.862	6.686

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603000D8Z / <i>Joint Munitions Advanced Technology</i>	Project (Number/Name) P301 / <i>Enabling Fuze Advanced Technology</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0602000D8Z P204: <i>BA2 Enabling Fuze Technology</i>	5.405	6.492	6.270	-	6.270	6.282	6.282	6.357	6.442	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- 1) Transitions 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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	67.834	17.212	8.670	-	-	-	-	-	-	-	Continuing	Continuing
206: <i>Explosive Ordnance Disposal/Low-Intensity Conflict</i>	11.601	3.374	1.500	-	-	-	-	-	-	-	Continuing	Continuing
207: <i>Special Reconnaissance Capabilities</i>	31.457	6.872	4.001	-	-	-	-	-	-	-	Continuing	Continuing
208: <i>Information Dissemination Concepts</i>	4.901	1.425	0.637	-	-	-	-	-	-	-	Continuing	Continuing
209: <i>Irregular Warfare Support (IWS)</i>	19.875	5.541	2.532	-	-	-	-	-	-	-	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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603121D8Z I <i>SO/LIC Advanced Development</i>
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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	17.403	8.682	-	-	-
Current President's Budget	17.212	8.670	-	-	-
Total Adjustments	-0.191	-0.012	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.184	-			
• Other	-0.007	-0.012	-	-	-

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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
206: Explosive Ordnance Disposal/Low-Intensity Conflict	11.601	3.374	1.500	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC)	3.374	1.500	-
<p>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).</p> <p>FY 2014 Accomplishments: Efforts were focused on Countering Improvised Explosive Devices (C-IED) and Electronic Countermeasures (ECM). Demonstrated a maritime, electromagnetic, non-lethal capability to disrupt outboard engines of small craft. Developed a global database of commercially manufactured electro-explosive devices, beginning with electric detonators containing characteristics to assist with identification and vulnerability assessment for future research and development efforts. Developed a method to deliver explosive charges that are deployable by mobile platforms and established protocols for effectively neutralizing defined IED threats. Evaluated a lightweight, back-packable robot for use in counter improvised explosive device operations in austere locations. Demonstrated a remote missile launch pod module that provides a precision engagement capability from an unmanned surface vehicle or other small craft. Developed a multi-purpose advanced tactical timer. Initiated development a compact, high-power next generation x-ray generator for EOD use. Initiated development of techniques and concept render safe tool(s) capable</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 206 / <i>Explosive Ordnance Disposal/Low-Intensity Conflict</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>of achieving high order or low order disposal of insensitive high explosive (IHE) munitions. Initiated development a suite of tools for Render Safe Procedures against underwater explosive devices.</p> <p>FY 2015 Plans: Efforts will focus 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.</p> <p>FY 2016 Plans: Remaining EOD/LIC projects are transitioned to Improvised Device Defeat/Explosives Countermeasures (IDD/EC).</p>			
Accomplishments/Planned Programs Subtotals	3.374	1.500	-

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603121D8Z / SO/LIC Advanced Development				Project (Number/Name) 207 / Special Reconnaissance Capabilities			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
207: Special Reconnaissance Capabilities	31.457	6.872	4.001	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: SPECIAL RECONNAISSANCE CAPABILITIES (SRC).	6.872	4.001	-
<p>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.</p> <p>FY 2014 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: audio and optical technologies; improvement in flexibility and accuracy through integration of disparate technologies into single devices; ultrahigh speed data processing and transmission; next-generation nanotechnology and miniaturization; affordable Application Specific Integrated Circuit (ASIC) technology; low profile enhanced micro-optics; next-generation precision Hostile Forces Tagging, Tracking, and Locating capabilities; low profile, advanced material miniature antennas; placement and concealment of unattended ground sensors; clandestine communications architectures; advanced biometric data collection, including high speed, portable DNA analysis; counter-surveillance systems: and low power, high bandwidth data transmission sub-systems.</p> <p>FY 2015 Plans: Continue 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</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 207 / <i>Special Reconnaissance Capabilities</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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	6.872	4.001	-

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / SO/LIC Advanced Development	Project (Number/Name) 208 / Information Dissemination Concepts
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
208: Information Dissemination Concepts	4.901	1.425	0.637	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: INFORMATION DISSEMINATION CONCEPTS	1.425	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 2014 Accomplishments: Enhanced language learning tools capabilities. Adapted and integrated existing foreign language applications, practices, and tools into a tactical site exploitation capability. Improved the timely collection of intelligence and evidence to support follow-on targeting, effective detainee prosecution, and theater-wide exploitation of tactical intelligence. Deployed capabilities to enrich language packet creation with a variety of media sources. Delivered a capability that supports the automated inbound and outbound integration of available video and audio sources. Developed novel approaches to query, track, and exploit multimedia from broadcast, radio, offline videos, and web sources.			
FY 2015 Plans: Develop 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	1.425	0.637	-

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 208 / <i>Information Dissemination Concepts</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
209: Irregular Warfare Support (IWS)	19.875	5.541	2.532	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: IRREGULAR WARFARE SUPPORT (IWS)	5.541	2.532	-
<p>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.</p> <p>FY 2014 Accomplishments: Under IW Joint Operational Concept (JOC 2.0) and DODD 3000.07 on IW, the IWS Program continued the research and development path in order to conduct operational analysis, concept design, and pilot-project experimentation efforts in support of 2010 QDR and current NSS/NSCT lines of engagements. Deployed an enhanced training capability and planned for transition to a program of record a counter- "green on blue" capability for ISAF and U.S. forces. This effort assisted 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. Continued to support an Advanced Situational Awareness Capability that includes instructor-led training and supporting publications for tactical unit leaders at the US Army Maneuver Center of Excellence (MCoE), Ft. Benning, GA. This capability led to trained units achieving the highest IED discovery rates in the OEF theater and saving coalition lives. This capability was ultimately transitioned to the US Army MCoE and they currently seek to enhance this capability with the training to counter "green on blue" violence that was previously mentioned in a hybrid training course. Continued to support Project LEGACY, a capability that significantly improves host-nation police</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 209 / <i>Irregular Warfare Support (IWS)</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>counterinsurgency and military intelligence capabilities. Conducted and completed a spiral effort of Legacy to provide training that institutionalizes within U.S. Forces and the Interagency the capability developed by the Legacy Program to deliver police/military investigative training to host nation security forces. Conducted an assessment of the relevance and applicability of specialized Security Force Assistance doctrine and operational approach for environments outside Operation Enduring Freedom. Continued to elicit and refine requirements for users within 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. Continued to research and develop threat group 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 media data for use in strategic and tactical operational planning and preparation of the battlefield with new end users and different support environments. 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. Continued to develop frameworks and training to better understand and implement Combatant Command (COCOM) -level Communication Activities. Delivered Return on Investment Analytic Framework for the COCOM VOICE Program in order to assist in garnering quantifiable measurements of performance, measurements of effectiveness and methods of determining overall return on investment (ROI) of program dollars. Additionally, this effort also developed 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. Conducted deep-dive research and analysis aimed at defining today's and the near future's typology of adversaries, their capabilities, intentions, use of terrain, weapons, technologies, proliferation schemes, U.S. technology and operational advantages adversaries will work to offset, and what the U.S. should be looking for to be better prepared when it faces off with these types of threats. Assisted with further development and understanding of the US Marine Corps concept of the Intelligence Driven Combat, to include international partnership and exchanges with Israel. Developed enhanced MISO/PSYOP capabilities in planning, targeting and execution for support to special and unconventional warfare mission requirements. Researched and started development of enhanced mobile capabilities 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). Conducted research, development, operational analysis, and field experimentation of efforts intended to counter emerging and extant threats in the intersection of the digital-physical domains (such as understanding the usage of social media by transnational criminal organizations in order to predict changes in support and influence; measures of effectiveness of social media and understanding how to use this media for intended effects). Initiated the Secure Unclassified Network (SUNet), which provided protected dynamic enclaves of capability for multi-agency users (Law Enforcement, Interagency, Defense, Coalition, and Foreign Nationals) in order to provide inter-organizational collaborative areas and enhanced capabilities of data upload, searching and sharing from headquarters down to smartphones, tablets or laptops. Research and development of a non-material effort intended to better understand indirect and irregular threats currently</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 209 / <i>Irregular Warfare Support (IWS)</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>facing the US, and how to implement effective measures against them. The studies and related activities undertaken for this project will fall under three broad lines of effort: 1) an analysis of indirect/irregular actions employed historically and how these capabilities may be applied to today's threat environment; 2) an analysis of current and the evolving irregular threat environment; and 3) identification and analysis of which of the capabilities the US could apply to prevail against irregular/indirect threats now and in the future.</p> <p>Initiated a research and development effort to assess 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 an initial framework to speed up and enhance organizational learning in the field; and operationalize framework through instruction/education aids.</p> <p>FY 2015 Plans: Continue 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 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</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603121D8Z / <i>SO/LIC Advanced Development</i>	Project (Number/Name) 209 / <i>Irregular Warfare Support (IWS)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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).</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>			
Accomplishments/Planned Programs Subtotals	5.541	2.532	-

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603122D8Z I <i>Combating Terrorism Technology Support</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	182.808	98.197	94.541	71.171	-	71.171	73.706	77.811	82.672	83.789	Continuing	Continuing
484: <i>Combating Terrorism Technology Support (CTTS)</i>	182.808	98.197	94.541	71.171	-	71.171	73.706	77.811	82.672	83.789	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. 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. The CTTS program is a diverse, advanced technology development effort that capitalizes on interagency and international participation to demonstrate the utility or 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 Office (CTTSO) 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 FY 2014, CTTS focused on DoD requirements that supported military forces in demanding or hostile environments such as Afghanistan, Yemen, Africa, the

Philippines, Mexico, and Colombia; by rapidly developing and delivering leading edge products such as tactical sensors and 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 include Legacy human source information programs in Afghanistan and Mexico, the Lighthouse and PALANTIR information collection and analysis systems, the Enhanced Mortar Targeting System (EMTAS), and Insider Threat Situation Awareness Training.

For U.S. federal, state and local law enforcement and first responders, CTTS improved personal protection equipment for chemical, biological, radiological, nuclear, and high explosive protection; as well as developed apps for interactive reference data to assist in identifying and neutralizing threat agents in the field and in laboratories. CTTS also hosted interagency and foreign partner information exchange seminars and capability exercises to share and enhance response techniques and procedures for first responders.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	PE 0603122D8Z I <i>Combating Terrorism Technology Support</i>

FY15 plans for CTTS will continue to address combating terrorism requirements from Defense, federal, state, local, and international customers and partners at home and abroad. As the withdrawal of U.S. forces from Afghanistan accelerates, CTTS will continue to address force protection needs for the remaining forces. Additionally, CTTS will increasingly address technology requirements requested from USSOCOM's field components as they increase their regional operations tempo in other parts of the world. Special emphasis will be for the Theater SOF in Africa and to support Theater SOF in the Pacific in support of the National Strategy to shift focus towards the Pacific. Specifically, CTTS will address personnel and physical security for small forces deployed to austere and hostile environments. In parallel, CTTS is increasing its support of the USMC as they reconstitute and improve the capacity and capabilities of the Marine Expeditionary Units. Another area of increased emphasis that has become even more concerning will be the protection of U.S. personnel, to include State Department personnel in embassy and consulate locations overseas that need increased security.

CTTS will continue to actively support the Department's Homeland Defense mission at NORTHCOM, including Defense support of civil authorities, interagency coordination, Special Operations support, and security cooperation. Consistent with that focus, this office will also work to address Department of Defense Security requirements 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.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	100.754	69.675	71.627	-	71.627
Current President's Budget	98.197	94.541	71.171	-	71.171
Total Adjustments	-2.557	24.866	-0.456	-	-0.456
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	25.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.515	-			
• Other Adjustments	-0.042	-	-	-	-
• FFRDC	-	-0.134	-	-	-
• FY 16 Baseline Adjustments	-	-	-0.277	-	-0.277
• Economic Assumptions	-	-	-0.179	-	-0.179

Change Summary Explanation

FY 2016 budget reduced due to fiscal constraints and higher priorities within the Department.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Title: Advanced Analytic Capabilities (AAC)	10.273	7.986	5.121

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603122D8Z / <i>Combating Terrorism Technology Support</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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Description: The Advanced Analytic Capability (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: counterterrorism, counterinsurgency, stabilization/re-construction missions and cyber-defense.

FY 2014 Accomplishments:
 Completed development of an enhanced integrated analytic platform that enabled analyses of diverse and disparate data sources to support near real-time decision making, collaboration, and training to support varied workflows tailored to operational requirements. Developed and began preparation for delivery an advanced audit tool to determine, over network or serial communications, whether the security configuration settings on field devices in industrial control systems are in compliance. Developed and delivered prototype software that enabled fusion of imagery and text-based data that relates changes in patterns of life to variables affecting quality of life. Began developing 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. Initiate the development of an enhanced Critical Thinking Tool that will support the application of evidence-based reasoning to intelligence questions and capture analytic problem-solving approaches. Started integration & performed initial operational evaluation of an Interagency analytic & situational awareness platform enabling fusion of existing sensors, social media, & analytic systems into a single platform. Continued development and proof of concept for multi-model analyses using Model Predictive Controllers (MPC) to make better decisions and establish measures of effectiveness for multiple courses of action. Initiated the application of an additional MPC model that allows regional agent-based analyses that also reduces dependence on subject matter experts for MPC analyses once conditions are initially set. Initiated development of a secure multi-intelligence collection & distributed processing platform with an open Application Programming Interface architecture capable of operating within a network at multiple classification levels.

FY 2015 Plans:
 Continuing 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. Completing the development of an enhanced Critical Thinking Tool that will support the application of evidence-based reasoning to intelligence questions and capture analytic problem- solving approaches. Continuing integration & performing initial operational evaluation of an Interagency analytic & situational awareness platform enabling fusion of existing sensors, social media, & analytic systems into a single platform. Finalize operational application of the Model Predictive Controller & evaluate with user communities to demonstrate significant improvements in identifying the quantity & quality of alternate courses of action, better decision making & resource optimization. Continue integration of Realistic Decision Models into Model Predictive Controllers to demonstrate data injection capabilities & reduced Subject Matter Expert dependence. Continue development & assessment of a secure multi-intelligence collection & distributed processing platform with an open

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<p>Application Programming Interface architecture capable of operating within a network. Begin development and coordinate user testing of a new tool to rapidly build and/or model the baseline of an Operational or Tactical environment sufficient to distinguish anomalies & responses to stimulation. Initiate development of a target & asset management system to provide Navy users that incorporates Intelligence, Meteorological & Oceanographic and adversary behavior to maximize the allocation of limited assets against an uncertain target set. Initiate development of an accurate social science modeling & measures of effectiveness tool to fill identified gaps & collaborate with existing efforts to support development of a community standard. Initiate research & development of new workflows based on an understanding of existing social media & open source work flows thereby reducing analytical time & decreasing material cost for users.</p> <p>FY 2016 Plans: Operationalize Model Predictive Controller with user communities to demonstrate significant improvements in identifying the quantity & quality of alternate courses of action, better decision making & resource optimization. Complete integration of Realistic Decision Models into Model Predictive Controllers & demonstrate data injection capabilities & reduced Subject Matter Expert dependence with user communities. Complete development & assessment of a secure multi-intelligence collection & distributed processing platform with an open Application Programming Interface architecture capable of operating within a network. Finalize development and coordinate user testing of a new tool to rapidly build and/or model the baseline of an Operational or Tactical environment sufficient to distinguish anomalies & responses to stimulation. Finalize development, deliver a target & asset management system and perform testing with Navy users by incorporating Intelligence, Meteorological & Oceanographic and adversary behavior to maximize their allocation of limited assets against an uncertain target set. Complete and perform testing of an accurate social science modeling & measures of effectiveness tool to fill user's gaps & collaborate with user's existing efforts to support development of a community standard. Finalize development & support user testing & evaluation of newly designed standardized workflows intended to reduce analytical time & decrease material cost.</p>			
<p>Title: CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR, AND EXPLOSIVES (CBRNE)</p> <p>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.</p> <p>FY 2014 Accomplishments: Completed development of a flexible, powered, air purifying respirator for Chemical, Biological, Radiological, and Nuclear (CBRN) environments, redesigning the system to give a lighter, low-profile capability. Completed development of a new Chemical and Biological (CB) protective mask for use in tactical environments and interoperability with tactical equipment. Continued development of a next generation National Fire Protection Association (NFPA) 1994 Class 3 CB sock for improved</p>	12.945	12.096	12.100

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comfort. Continued development of a decision support tool for determining proper work/rest cycles in CB protective clothing. Completed evaluation of enhanced liquid tight integrity testing methods/procedures for the evaluation of CB protective ensembles. Initiated 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 next generation CB glove for improved comfort and dexterity. Completed development of a pump free, gravity driven water purifier capable of producing potable water for an operator in austere conditions. Completed development of a desalination filter which provides several liters of drinking water in austere environments. Completed development of a filter which provides up to 300 liters of drinking water in austere environments. Continued development of a powder material with imbedded chemical detection and decontamination properties. Continued development of an unobtrusive, colorimetric detection system capable of discreetly notifying the operator of a positive detection of select chemical warfare agents. Completed evaluation of a portable system to quickly screen personnel for explosive threats at temporary venues. Initiated development of a miniature, hand-portable mass spectrometer for the detection of chemical and explosive threats. Initiated development of explosives detection technology for monitoring cargo containers. Initiated development of enhanced sampling materials and high volume samplers for CBRNE threats. Continued development of colorimetric fabrics for the detection of bulk explosive materials. Continued development of a spatially offset Raman technology capable of identifying materials through non-metallic packaging. Completed development of a low-cost, single-use test kit to rapidly identify explosives and explosive precursors. Continued development of a handheld, explosives particulate detector for inorganic homemade explosives threats. Initiated development of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. Completed development of a low cost, Raman spectroscopy instrument for the detection of explosive materials. Completed development of a threat/no threat detector for the detection of primary and secondary explosives. Initiated development of a portable glove box suitable for working with CBRN materials in field operations. Continued to evaluate potential methods of production of threat materials, and identify key indicators and warnings of clandestine production methodologies for response personnel. 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. Initiated development of a modified commercial endoscope capable of CB agent collection that can be manipulated into tight spaces. Completed development of a computer-based training program for the use of ion mobility spectrometry based explosives detection equipment. Initiated development of optimized sampling media for the collection of trace explosive materials. Initiated development of next generation sensors for use in trace, bulk, proximity, and stand-off detection of explosives-based threats.

FY 2015 Plans:
Conduct field evaluations of a new CB protective mask for use in tactical environments and interoperability with tactical equipment. Conduct field evaluations of a next generation CB glove for improved comfort and dexterity. Evaluate a next generation NFPA 1994 Class 3 CB sock for improved comfort. Complete development of a decision support tool for determining proper work/rest cycles in CB protective clothing. Revise the American Society for Testing and Materials enhanced liquid tight integrity testing

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methods/procedures for the evaluation of CB protective ensembles. Continue development of analytical and sampling procedures for the non-destructive evaluation of CB protective clothing for key contaminants in the field, and initiate incorporation of findings into a decision support matrix. Initiate development of a water filtration system capable of producing potable water for 20-50 operators in austere conditions. Initiate 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 the toxic industrial chemicals listed in NFPA 1994, 2012 edition while allowing for communication and interoperability with tactical equipment. Initiate development of a ruggedized garment which provides NFPA 1994, Class 3 and NFPA 1992 protection. Initiate NFPA 1999 testing on protective clothing for emergency medical operations. Continue development of a powder material with imbedded chemical detection and decontamination properties. Continue development of an optimized sampling media for the collection of trace explosive materials. Continue development of an unobtrusive, colorimetric detection system capable of discreetly notifying the operator of a positive detection of select chemical warfare agents. Continue development of a miniature, hand-portable mass spectrometer for the detection of chemical and explosive threats. Complete development of explosives detection technology for monitoring cargo containers. Initiate testing and evaluation of colorimetric fabrics for the detection of bulk explosive materials. Complete development of a spatially offset Raman technology capable of identifying materials through non-metallic packaging. Continue development of next generation sensors for use in trace, bulk, proximity, and stand-off detection of explosives-based threats. Continue development of enhanced sampling materials and systems for CBRNE threats. Complete development of a handheld, explosives particulate detector for inorganic homemade explosives threats. Continue development of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. Initiate 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. Complete evaluation of the effects of decontamination products on deoxyribonucleic acid signatures of interest. Initiate development of advanced analytical tools for the analysis of chemical and biological agent production methods. 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. Complete development of a portable glove box suitable for working with CBRN materials in field operations. Complete development of a modified commercial endoscope capable of CB agent collection that can be manipulated into tight spaces. Initiate development of a scalable, vacuum, evidentiary collection device for the collection and preservation of known or suspected biological agent powders. Continue to evaluate potential methods of production of threat materials, and identify key indicators and warnings for response personnel. Initiate development of a modular computer/web-based training package for hand-held explosive detection technologies. Initiate development of new algorithms that increase the specificity and improve the overall utility of commercial Raman explosive detection systems. Initiate development of enhanced decontamination procedures for a post CBRN event.

FY 2016 Plans:

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<p>Continue development of a ruggedized garment which provides NFPA 1994, Class 3 and NFPA 1992 protection. 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 the toxic industrial chemicals listed in NFPA 1994, 2012 edition while allowing for communication and interoperability with tactical equipment. Continue field evaluations of a new CB protective mask for use in tactical environments and interoperability with tactical equipment. Complete field evaluations and certify a next generation NFPA 1994 Class 3 CB sock for improved comfort. Complete field evaluations and certify a next generation CB glove for improved comfort and dexterity. Continue development of a water filtration system capable of producing potable water for 20-50 operators in austere conditions. Initiate development of next generation chemical protective materials, systems, and ensembles. Initiate CBRN respirator testing against additional toxic industrial chemicals representing the current threats encountered. Complete development of a powder material with imbedded chemical detection and decontamination properties. Complete development of an unobtrusive, colorimetric detection system capable of discreetly notifying the operator of a positive detection of select chemical warfare agents. Continue development of a miniature, hand-portable mass spectrometer for the detection of chemical and explosive threats. Continue testing and evaluation of optimized sampling media for the collection of trace explosive materials. Complete development of colorimetric fabrics for the detection of bulk 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 testing and evaluation of a novel bio-sensor based upon pyroelectric transducer technology for the detection of biological warfare agents. 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 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. Continue evaluation of advanced analytical tools for the analysis of chemical and biological agent production methods. Continue evaluation of decision support tools for providing medical information and recommendations in hostile environments. Continue evaluation of potential methods of production of threat materials, and identify key indicators and warnings for response personnel. Continue development and evaluation of a modular computer/web-based training package for hand-held explosive detection technologies. Continue development of new algorithms that increase the specificity and improve the overall utility of commercial Raman explosive detection systems. Continue development of a scalable, vacuum, evidentiary collection device for the collection and preservation of known or suspected biological agent powders. 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.</p>			
<p>Title: IMPROVISED DEVICE DEFEAT (IDD)</p> <p>Description: The IDD Subgroup's objective is to provide rapid prototyping, capability development and delivery of advanced technologies, tools, and information to improve the operational capabilities of federal, state, and local bomb squads and the U.S. military Explosive Ordnance Disposal (EOD) community to defeat and neutralize the full spectrum of terrorist explosive devices.</p>	4.075	3.478	3.600

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In collaboration with military, federal, state, and local agencies, the IDD Subgroup identifies and prioritizes multi-agency user requirements through joint working groups and then actively works with vendors and end-users to deliver advanced prototype systems that provide more efficiency and a greater degree of 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 2014 Accomplishments:

Completed development and commercialized the iLIVE inline video enhancement module for robot cameras. Completed development and commercialized the Scalable Improvised Device Disruptor to counter VBIEDs. Completed development and evaluation of a VBIED threat assessment system. Completed development and commercialized a VBIED toolkit. Completed development of a mechanically initiated remote wire cutting tool to increase safe separation from command or detonator wires being cut while maintaining control of the procedure. Completed development and evaluation of the Mobile Explosive Device Neutralizer (MEDN) that provides the capability to remotely unscrew end caps from pipe type IEDs to include jars and jugs of possible precursor materials used in drug or explosive manufacturing. Initiate development of an explosively initiated tool for remotely opening vehicle trunk locking mechanisms. Completed development of a remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Initiated development of a submersible remotely operated vehicle to counter water borne IEDs.

FY 2015 Plans:

In support of PPD 17 – Countering Improvised Explosive Devices, the IDD subgroup transitions in FY15 to a new name, Improvised Device Defeat/Explosives Countermeasures (IDD/EC), but will continue to support the requirements of both military Explosive Ordnance Disposal (EOD) technicians and Public Safety Bomb Squads. Explosives Countermeasures encompasses other explosives threats and hazards that are encountered by other first responders. The remaining projects under EOD/LIC will transition over to IDD/EC at the beginning of FY15. The IDD/EC subgroup will continue development, evaluation to commercialize an explosively initiated tool for remotely opening vehicle trunk locking mechanisms. Continue development and operational evaluation of a submersible remotely operated vehicle to counter water borne IEDs. Complete development of a Force Feedback Retrofit Kit to provide enhanced visual awareness of pressures exerted on object held in a robot gripper. Initiate development of 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. Develop a Mobile device application for worldwide incidents involving improvised explosive device technical data accessible to bomb technician. Initiate 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. Continue development to modify and environmentally harden a remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Continue development for threats presented by use of additive manufacturing processes

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<p>for construction and concealment of devices containing explosives or their precursors. Initiate Development of a 3-D printable robot for bomb squad use.</p> <p>FY 2016 Plans: Continue development to make improvements to the submersible remotely operated vehicle to counter water borne IEDs based on operational evaluation. 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 decision support tool that covers the full range of issues involved in vehicle-borne improvised explosive device (VBIED) response by bomb disposal personnel. Continue development of an environmentally hardened, remotely delivered and operated pan-and-tilt render safe capability for IED disruption. Initiate 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. Continue development of a 3-D printable robot designed for remote reconnaissance and interrogation of suspect VBIEDs. Continue development of the efficacy of additive manufacturing processes as a means to rapidly prototype and deliver tools for use in counter IED operations.</p>			
<p>Title: INVESTIGATIVE AND FORENSICS SCIENCE</p> <p>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.</p> <p>FY 2014 Accomplishments: Completed development and dissemination of an extensive forensic system and repository to establish the origin of materials from homemade explosives and IEDs. Completed development of a distributed forensic tool that analyzes counterfeit identity and travel documents and links them to other criminal and terrorist incidents. Completed development of a comprehensive set of forensic procedures to analyze inks to determine if documents are counterfeit or genuine. Completed development of a technology that visualizes latent fingerprints based on novel human antibodies and nano-technology. Completed the primary phase of an interagency research, development, test, and evaluation strategy and roadmap for the federal investigative and forensic science community. Initiated testing and evaluation of commercially available rapid DNA instruments for use in combating terrorism operations. Initiated development of an effective forensic microbial proteomic methodology for biological samples to aid in source attribution. Initiated the development of a field-deployable prototype system for automated rapid processing of human DNA</p>	4.508	4.840	4.840

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<p>profiles using short tandem repeat loci. Initiated development of advanced methods to analyze visual, verbal, and behavioral cues of persons to determine their likelihood of being an insider threat to commit violence, espionage, and sabotage and build a network of researchers to further advancements in this field. Initiated the development and validation of more productive and effective methods of interrogating and interviewing persons for human intelligence collection in law enforcement and tactical environments. Initiated the development of a forensic opium poppy DNA methodology to determine the geographic origin of heroin. Initiated development of the best practices for expeditionary forensic operations. Initiated development of an advanced facial thermal imaging technology to determine credibility and intent. Initiated development of a comprehensive forensic procedure to separate mixed DNA samples by using nuclear DNA. Initiated the secondary phase of an interagency research, development, test, and evaluation strategy and roadmap for the federal investigative and forensic science community.</p> <p>FY 2015 Plans: Complete the secondary phase of the interagency research, development, test, and evaluation strategy and roadmap for the federal investigative and forensic science community. Complete testing and evaluation of a commercially available rapid DNA instruments for use in combating terrorism operations. Complete development of an effective forensic microbial proteomic methodology for biological samples to aid in source attribution. Complete development of a field-deployable prototype system for automated rapid processing of human DNA profiles using short tandem repeat loci. Complete 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. Complete development of more productive and effective methods of interrogating and interviewing persons for human intelligence collection in law enforcement and tactical environments. Complete development of a forensic opium poppy DNA methodology to determine the geographic origin of heroin. Initiate development of a tool that automatically ingests and analyzes data from mobile device and produces intelligence reports. Initiate the development of an automatic tool that recognizes and identifies faces in uncontrolled files and images. Initiate the development of a remote identification card image system for the detection of suspected fraudulent ID cards at checkpoints. Initiate the development of a system for acquiring and identifying chemical signatures of substances found at incident scenes. Complete development of an advanced facial thermal imaging technology to determine credibility and intent.</p> <p>FY 2016 Plans: Complete development of a comprehensive forensic procedure to separate mixed samples DNA by using nuclear DNA. Complete development of a tool that automatically ingests and analyzes data from mobile device and produces intelligence reports. Complete development of an automatic tool that recognizes and identifies faces in uncontrolled files and images. Complete development of a remote identification card image system for the detection of suspect fraudulent ID cards at checkpoints. Complete development of a system for acquiring and identifying chemical signatures of substances found at incident scenes.</p>			
Title: Irregular Warfare and Evolving Threats (IW/ET)	2.064	3.500	3.615

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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 2014 Accomplishments:

Continued development of a field prototype digital workflow management and content approval capability called Nightingale for members of the Counter Terrorism Strategic Communication community of practice who actively engage on social media platforms. This effort provided critical test and evaluation for operational deployment. Continued research and 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. The studies and related activities undertaken for this project fall under three broad lines of effort: 1) an analysis of indirect/irregular actions employed historically and how these capabilities may be applied to today’s threat environment; 2) an analysis of current and the evolving irregular threat environment; and 3) identification and analysis of which of the capabilities the US could apply to prevail against irregular/indirect threats now and in the future. Initiated research and development of a low-cost, effective and efficient method of extending or creating sustainable governance in large urban environments through relevant doctrine, training, technology and innovative partnerships. Utilizing Secure Unclassified Network (SUNet) architecture, this effort facilitated dialog and information sharing among entities involved in developing community resilience/resistance in the face of armed violence and the development of a platform to test and evaluate tools and TTPs for use in the "ungoverned" or "under-governed" urban environment. Initiated 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).

FY 2015 Plans:

Complete 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

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<p>media platforms. This effort entirely novel to the United States Government will provide critical test and evaluation for operational deployment, enabling US operators to more effectively contest the informational domain. Complete development of a non-material effort intended to better understand indirect and irregular threats currently facing the United States and implement effective measures against the threats. This effort will support the Army Special Operations Command and will include war-gaming and experimentation, strategy assessment and recommendations for future operations planning. Continue research and development of a low-cost, effective and efficient method of extending or creating sustainable governance in large urban environments through relevant doctrine, training, technology and innovative partnerships. Utilizing Secure Unclassified Network (SUNet) architecture, this effort facilitates dialog 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. Continue 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). Initiate an operational test of Network Enablement Capability 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. Initiate 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. Initiate the development of an automated capability to intuitively visualize geographic and functional areas of latent and/or emergent instability in the Dark Web. Discerning, then monitoring latent instability manifest in Dark Web precursors would enable the development of more nuanced, contextually appropriate and proactive theater-strategic policy reflected in: 1) more efficient and effective strategic communications and military information support operations (MISO), 2) enhanced military-to-military engagements, and 3) with an emphasis on unclassified and shareable information/knowledge, and the creation of "shared understanding" amongst partners and Allies leading to combined mitigation actions. Initiate an effort to develop solutions and/or enhance the integration of intelligence and military operations with information operations (IO). This effort will explore how cognitive and information dimensions can be better displayed both geospatially and temporally, and seeks to integrate multiple databases from all sources of intelligence and information (HUMINT, SIGINT, MASINT, GEOINT, OSINT, and social media) to provide the IO community an intuitive visualization of the information environment per Joint Publications 3-13 (Information Operations) and 2-01.3 (Joint Intelligence Preparation of the Operational Environment). Initiate the development of new concepts and constructs for understanding the role of virtual currencies in threat finance. This effort will explore the unique and required skills necessary to understand and react to the rapidly evolving architecture of threat finance networks within a radically connected hybrid warfare context and will develop solutions to combat vulnerabilities posed by virtual currencies. Initiate development of multiple next-generation information related capabilities (IRCs) and associated technical</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>means that advance concepts and pursue capabilities identified in IW/ET's FY14 net-assessment of next-gen IO and information related capabilities.</p> <p>FY 2016 Plans: Complete development of a low-cost, effective and efficient method of extending or creating sustainable governance in large urban environments through relevant doctrine, training, technology and innovative partnerships. Utilizing Secure Unclassified Network (SUNet) architecture, this effort facilitates dialog 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 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 the development and operational test of Clever Enabler Network Enablement Capability with Special Operations Command Africa. Final deliverable will be an exportable all source intelligence training curriculum for use with partner nations. 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. Complete the effort to develop an automated capability that intuitively visualizes geographic and functional areas of latent and/or emergent instability in the Dark Web. Discerning, then monitoring latent instability manifest in Dark Web precursors would enable the development of more nuanced, contextually appropriate and proactive theater-strategic policy reflected in: 1) more efficient and effective strategic communications and military information support operations (MISO), 2) enhanced military-to-military engagements, and 3) with an emphasis on unclassified and shareable information/knowledge, and the creation of "shared understanding" amongst partners and Allies leading to combined mitigation actions. Complete and deliver a capability that enhances the integration of intelligence and military operations with information operations (IO). This effort will explore how cognitive and information dimensions can be better displayed both geospatially and temporally, and seeks to integrate multiple databases from all sources of intelligence and information (HUMINT, SIGINT, MASINT, GEOINT, OSINT, and social media) to provide the IO community an intuitive visualization of the information environment per Joint Publications 3-13 (Information Operations) and 2-01.3 (Joint Intelligence Preparation of the Operational Environment). This is especially important as the emergence of hybrid warfare continues to erode the lines between violence, coercion, influence and insurgency that, left unobserved, will leave decision makers with little time or options for action. Complete and deliver new concepts and constructs for understanding the role of virtual currencies in threat finance. This requirement will explore the unique and required skills necessary to understand and react to the rapidly evolving architecture of threat finance networks within a radically connected hybrid warfare context and will develop solutions to combat vulnerabilities posed by virtual currencies. Continue to develop and deliver, through the end of the contract in FY17, a 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</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>(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. Completion of 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. Initiate new efforts to develop and deploy capabilities that support DoD, interagency and foreign partners and allies who are confronting ever evolving threat networks and complex global operational environments.</p>			
<p>Title: PERSONNEL PROTECTION</p> <p>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.</p> <p>FY 2014 Accomplishments: Continued development for systems to enhance situational awareness, intelligence collection capabilities, and personnel recovery efforts for operational evaluation and deployment. Completed development and deployed a mobile surveillance platform that captures, records, encrypts, and streams multi-channel video and audio with associated GPS position information to a command center for enhanced situational awareness and incidence response. Completed development and delivered micro unmanned aerial systems that provide real-time situational awareness to military and law enforcement personnel for operational evaluation. Continue development of a capability that activates a vehicle tracking, tagging, and locating device upon detection of a blast. Completed development and delivered a multifunctional earpiece that provides in ear hearing protection as well the ability to collect pressure and acceleration data during blast or blunt impact events. Continued development of techniques that assess 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. Continue development of a whole body deformation tool that provides analysis and protective solutions for vehicles, ships, and buildings. Completed development and testing for a novel vehicle armor solution for alternative fuel vehicles. Initiated development of a mobile blast mitigation barrier that mitigates fragmentation effects of a behind the wall improvised explosive device. Initiated development for a tethered aerial platform that enhances situational awareness and communication capabilities. Initiated development for counter unmanned aerial vehicle capabilities. Initiated development of a concealable armor system that provides rifle threat protection. Initiated development of a novel lightweight armor material that provides rifle protection. Initiated development of automated exploitation algorithms for light detection and ranging data. Initiated development of a three dimensional personnel tracking and locating system for use within structures. Initiated development of a capability for local data storage of maps for operational use in austere environments.</p> <p>FY 2015 Plans:</p>	8.231	8.986	9.150

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Continue development and delivery of systems that enhance situational awareness, intelligence collection capabilities, and personnel recovery efforts. Complete development and deploy a capability that activates vehicle tracking, tagging, and locating device upon detection of a blast. Completed development and delivery a whole body deformation tool and analysis for the development of protective solutions for vehicles, ships, and buildings. Initiate development of a wireless tactical communications headset. Continue development of a tethered aerial platform for enhanced situational awareness and communication capabilities. Continue development of counter unmanned aerial vehicle capabilities. Continue development of a concealable armor system that provides rifle threat protection. Continue development of a novel lightweight armor material that provides rifle protection. Continue development of automated exploitation algorithms for light detection and ranging data. Continue development of a three dimensional personnel tracking and locating system for use within structures. Complete development of a capability for local data storage of maps for operational use in austere environments. 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. Completed development of a mobile blast mitigation barrier that mitigates fragmentation effects of a behind the wall improvised explosive device. Initiate development a multi radio device that combines multiple radios, GSM and Iridium communication capabilities into one device. Initiate 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. Initiate development of a multifunctional head protection system that can achieve ballistic and blast protection, and incorporates communication and data display capabilities. Initiate development of an enhanced personal duress system to increase system range and decrease device form factor to a novel size. Initiate development of a novel material for ballistic and blast protection that utilizes fiber optics to enable visibility with opaque armor.</p> <p>FY 2016 Plans: Complete Development of systems to enhance situational awareness, intelligence collection capabilities, and personnel recovery efforts. Complete development of a wireless tactical communications headset. Complete development of a tethered aerial platform for enhanced situational awareness and communication capabilities. Completed development of counter unmanned aerial vehicle capabilities. Completed development of a concealable armor system that provides rifle threat protection. Completed development a novel lightweight armor material that provides rifle protection. Complete development automated exploitation algorithms for light detection and ranging data. Continue Development of a three dimensional personnel tracking and locating system for use within structures. Continue development of a multi radio device that combines multiple radios, GSM and Iridium communication capabilities into one device. Complete development 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. Continue development of a multifunctional head protection system that provides ballistic and blast protection, and incorporates communication and data display capabilities. Complete development of an enhanced personal</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>duress system that can operate at increased range and a decreased device form. Continue development of a novel material for ballistic and blast protection that utilizes fiber optics to enable visibility with opaque armor.</p> <p>Title: PHYSICAL SECURITY</p> <p>Description: Develop capabilities to address physical security vulnerabilities associated with forward deployed military and civilian personnel, domestic security and first responder personnel, and U.S. Government facilities in the U.S. and abroad, and rapidly transition those capabilities to the users. Focus technology development efforts in support of joint and interagency requirements that are directed along the U.S. borders, at U.S. embassies and consulates, at mass transportation and commerce nodes, in Maritime port and littoral environments, and in support of large scale public gatherings.</p> <p>FY 2014 Accomplishments: Completed development of database and Vulnerability Assessment and Protection Option (VAPO) development program on blast response against multi-layered systems and Forward Operating Bases to improve protection capabilities. Completed development of a comprehensive homemade explosives database with multiple levels of access. Completed development of decision support aids for the intelligence and technology community regarding novel explosives threats. Completed development and implementation of an International Homemade IED Working Group Roadmap for communities of interest to facilitate collaboration and consolidation of ongoing parallel and complementary efforts. Completed development of an HME desensitization guide for first responders. Completed development of a man-portable Bandolier line charge system to disrupt a path of earth with the intent of exposing or disrupting nonmetallic/metallic buried IED threats. Completed development of a rapidly and easily deployable and recoverable self-contained security and video observation/surveillance system. Completed development of a swimmer/ small vessel detection technology based on electro-optical sensors to provide situational awareness for port security and open water operations. 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 fast-running, CHINOOK-based computational tool to assist Federal and municipal planners and first responder personnel in predictive blast analysis in an urban environment. Initiated development of explosive testing methodology to reinforce critical infrastructure design for mitigated and unmitigated brick tunnels. Completed development and rollout of the Web-enabled Blast Information Systems (WBLIS) database. Initiated development of a tool for an understanding of TNT equivalency that will provide operational forces necessary information for protecting personnel and infrastructure. Initiated 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 and for stand-off underground void and tunnel detection. Initiated development of a rapidly deployable, temporary antipersonnel barrier system to protect fixed and expeditionary facilities in response to increased threat levels. Initiated development of an IR-based detection system with automatic focus to allow for enhanced detection of explosive and weapon threats in operational environments. Initiated development of tactical arresting systems designed to stop vehicles</p>	7.511	8.270	8.320

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>over a short distance. Initiated development of an Advanced Diver Data Display System final prototype for combat swimmers. Completed development of a remote control adjustable charge capable of deployment by mobile platforms to effectively neutralize defined IED threats. Completed development of a multi-purpose advanced tactical timer prototype for operational test and evaluation. Continued development of an advanced active diver thermal protection system for long exposure dives, including SEAL Delivery Vehicle (SDV) operations. Completed initial multi-phased testing of the HALO Maritime Barrier System to validate performance in stopping power against small boat threats and in automated Gate Opening/Closing capability. Completed development of non-lethal medium and large vessel immobilization systems. Completed development of protection capabilities and counter measure decision aids regarding ultra-high performance concrete. Initiated and completed development of a resource guide and specification workbook to assist security professionals in identifying active vehicle barrier (AVB) requirements and selecting appropriate AVB's for their site. Initiated development of an upgraded tactical compact aerostat system for intelligence, surveillance and reconnaissance, as well as communication between non-line-of-sight (NLOS) forces. Continue the development and assessment of the Military Blast Expert Evaluation Software to aid commanders in protecting US military expeditionary bases globally.</p> <p><i>FY 2015 Plans:</i> 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 fast-running, CHINOOK-based computational tool to assist Federal and municipal planners and first responder personnel in predictive blast analysis in an urban environment. Complete development of explosive testing methodology to reinforce critical infrastructure design for mitigated and unmitigated brick tunnels. Continue development of a 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 and for stand-off underground void and tunnel detection. Continue development of a rapidly deployable, temporary antipersonnel barrier system to protect fixed and expeditionary facilities in response to increased threat levels. Continue development of an IR-based detection system with automatic focus to allow for enhanced detection of explosive and weapon threats in operational environments. Continue 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. Continue 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. Initiate 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. Initiate 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</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>performance concrete slab model, WAC-U, and improve tools for design, protective use, and vulnerability assessments. Initiate 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. Initiate 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. Initiate development of materials and mechanisms for tactical delivery of novel non-lethal solutions for maritime vessel disablement. Initiate 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 Barrier System. Initiate development of a mobile application to enhance and host the Vehicle Explosion Analysis Software. Complete the development and assessment of the Military Blast Expert Evaluation Software to aid commanders in protecting US military expeditionary bases globally.</p> <p>FY 2016 Plans: 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 a rapidly deployable, temporary barrier system to protect fixed and expeditionary facilities in response to increased threat levels. Complete development of an IR-based detection system with automatic focus to allow for enhanced detection of explosive and weapon threats in operational environments. Complete development of tactical arresting systems designed to stop vehicles over a short distance. 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. Continue development of a fast-running ultra-high performance concrete slab model, WAC-U, and improve tools for design, protective use, and vulnerability assessments. Continue development of a high performance towed sled to provide increased payload and deployment options for existing combatant craft used by Naval Special Warfare (NSW). Continue 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 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. Continue 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 Barrier System.</p>				
Title: SURVEILLANCE, COLLECTION AND OPERATIONS SUPPORT		18.187	19.068	9.175

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<p>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.</p> <p>FY 2014 Accomplishments: Completed development of the selection and assessment tools for the selection process of Special Operations Forces. Completed enhanced custom force tagging, tracking and locating capabilities. Initiated development of a standard explosives scent kit for training explosive detector dogs. Initiated development of Special Operations Forces training programs to leverage Cyber Operational Preparation of the Environment (C-OPE). Initiated development field technical surveillance capabilities and enhanced custom force tagging, tracking and locating capabilities. Initiated development of a new capability to manage and protect privacy and personal information to include social networks, public, and private databases. Initiated development of Utilized Unmanned Aerial Vehicles platforms as novel communication relay nodes. Initiated development of new language technologies into operational media exploitation tools.</p> <p>FY 2015 Plans: Initiating development of customized force tracking capabilities into existing fielded technologies. Initiating integration of public and private databases into a single user interface application to protect privacy and personal information. Initiating development of cyber-related tools for the timely collection of intelligence and evidence to support follow-on targeting, effective detainee prosecution, and theatre-wide exploitation of tactical intelligence. Initiating development of cyber-related tools for the timely collection of intelligence and evidence to support follow-on targeting, effective detainee prosecution, and theatre-wide exploitation of tactical intelligence. Initiating development of enhance research technology to assist analysts with biometric intelligence and reporting. Continue development and test standardized canine explosive scent training kits. Continue development an enhanced capabilities to leverage Cyber Operational Preparation of the Environment (C-OPE). Initiated deployment of field technical surveillance capabilities and enhance custom force tagging, tracking and locating capabilities. Continue to develop a capability to manage and protect privacy and personal information to include social networks, public, and private databases. Continue development of Unmanned Aerial Vehicles to reduce payloads for effective and efficient communication relays. Continue development translation and exploitation tools in new languages for social media exploitation.</p> <p>FY 2016 Plans: Continuing development of enhance research technology to assist analysts with biometric intelligence and reporting. Complete development of standardized canine explosive scent training kits. Continue developing and expanding upon enhanced capabilities to leverage Cyber Operational Preparation of the Environment (C-OPE). Continue to develop customized force tracking capabilities into existing fielded technologies and transition existing systems and tools.</p>			
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<p>Continue development in Identity Management tools. Continue development of Unmanned Aerial Vehicles to reduce payloads for effective and efficient communication relays. Continue development of translation and exploitation tools in new languages for social media exploitation. Initiating development and improving surveillance capabilities and enhance custom force tagging, tracking and locating capabilities. Initiating development of cyber-related tools for the timely collection of intelligence and evidence to support follow-on targeting, effective detainee prosecution, and theatre-wide exploitation of tactical intelligence. Initiating development of export template-based lessons and activities to a variety of mobile devices for continuous tactical situational awareness and learning beyond the classroom.</p>			
<p>Title: TACTICAL OPERATIONS SUPPORT</p> <p>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; Specialized Access Systems; Tactical Communications; Intelligence, Surveillance, Target Acquisition, and Reconnaissance Systems (ISTARS); Unconventional Warfare; Survivability Systems.</p> <p>FY 2014 Accomplishments: Completed development of a specialized application for commercially available smart phones providing a mass alert tool capability that reports and disseminates incidents to U.S. Border Patrol agents enabling rapid response and increased interdictions, arrests and seizures via geo-rectified text messages, pictures and full motion video. Completed development 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. Delivered a lightweight organic cell phone network that provides secure voice and secure high speed data services to at least 16 users simultaneously. Delivered a system that alerts a ground force commander as to the status of his deployed sniper teams, to include still video of shooter’s visual on target, in real-time, over organic radio links. Developed and delivered a system of clip-on small arms illumination, pointing and infrared imager devices that operate in both the visible, near, and short wave infrared spectrums. Delivered and continued development of a 20 pound micro tactical ground robot capable of negotiating rugged terrain and climbing complex obstacles for visual and acoustic surveillance and reconnaissance missions and to identify and defeat improvised explosive devices. Delivered a tactical audio video collection and recording system integrated and worn in civilian clothing. Delivered a hand emplaced, remotely operated, real-time, tactical visual surveillance system that has an integrated power supply and SATCOM/Cellular data link. Completed development 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. Delivered a real-time, standoff imaging capability for the detection of concealed weapons. Developed a single man-portable, collapsible-wing tactical micro unmanned aerial system with a secure mobile ad-hoc mesh radio network data-link that is capable</p>	20.777	16.134	8.350

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>of being assembled and hand-launched in less than 60 seconds. Delivered a mobile-mesh network enabled Trojan Scout Unmanned Aerial system providing dismounted operators with an enhanced organic capability to identify threat networks in remote environments with safe stand-off from potential adversaries. Delivered a fused thermal and image intensified clip-on small arms night vision weapons sight. Completed development of a lightweight, modular handheld intelligence, surveillance, target acquisition, reconnaissance system. Delivered a modular concealable sniper rifle with all components measuring less than 16.5 inches. Generated internal flight and terminal ballistic data on the 6.8mm x 43 round optimized for military applications, in order to determine the suitability of an intermediate caliber for combat operations as compared to 5.56mm and 7.62mm designs. Delivered 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. Delivered an upper receiver group that provides a significant reduction in size and improvement to suppression of both sound and flash compared to the current U.S. standard M4 rifle. Continued to provide program of instruction advanced training and kit to Special Operations Forces (SOF) and select interagency tactical operations snipers to improve long range target interdiction of multiple targets at varying ranges, resulting in a maximum effective range of 1,800 meters. Completed development 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. Initiated and delivered social media mobile training teams for tactical user preparation of the environment, operational surety, and force protection. Delivered a spiral development defensive tactical level cyber enabled digital operations program of instruction. Delivered ballistic protective tactical eyewear capable of near instantaneous transition from clear to amber, blue, and dark gray for use in dynamic lighting environments in combat operations. Initiated development 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. Initiated development of a sniper ballistic and downwind sensor system to increase first round hit capability. Delivered microSD cards capable of high computing and lower power use for handheld smartphones. Initiated development of an acoustic tooth communicator system for low-visibility operations. Delivered a handheld electronic optical device that provides stabilization when trying to view targets on an unstable viewing platform for Special Reconnaissance. Initiated 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. Initiated development of a man-portable aerial radar system that can detect unmanned aerial vehicles and ultralights at the tactical edge. Initiated development 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. Initiated development of a multispectral augmented visually enhanced reality imaging capability that provides a significant advantage for long range target acquisition in challenging environments. Initiated development of a maritime canister launched small unmanned aerial system for amphibious and maritime operations requiring overhead aerial ISR capabilities. Initiated and delivered an online and social media awareness video for DOD and Interagency family members to educate on current threats and mitigate vulnerabilities. Initiated the development of a cyber-advanced support operations course focused on training tactical operators to screen social media with anonymity for operational preparation of the</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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environment and force protection. Initiated development of an air mobility vehicle with analysis of alternatives initiative to conduct training and an operational feasibility assessment for unconventional warfare. Initiated development of a tactical platform marking kit capable of discretely tagging stationary and moving targets for tracking with legacy night vision devices. Initiated development of a portable tactical micro marker system to enhance personnel recovery operations. Initiated an effort to test and evaluate a new ground mobility vehicle for Special Operations Forces (SOF) to increase survivability and provide signature reduction. Initiated development of an underwater vision enhancement device for ship hull inspections in turbid water and for maritime to land operations. Initiated development of an extremely low volume, low profile, concealable GPS logger.

FY 2015 Plans:

Deliver a Special Operations Forces (SOF) advanced ballistic engine and rangefinder capability to increase first round hit potential and provide for ease-of-use shot correction information for warfighters. Deliver a sniper ballistic and downwind sensor system to increase first round hit capability. Develop and deliver next generation small arms signature reduction suppressors for the MK18 CQBR and M4. Initiate development of a lightweight intermediate caliber cartridge utilizing polymer material technologies to reduce combat load and enhance terminal ballistics. Initiate development of a 5.56mm polymer round to reduce weight for standard issue rounds, enhancing combat effectiveness and reducing warfighter fatigue and cost. Initiate development of a lethal miniature aerial munition system (LMAMS) with substantially improved maneuverability, attack angle, loiter time, and lethality with a full mission profile flight training variant. Initiate and deliver an enhanced military free fall navigation board that incorporates Android applications for greater command and control and mission planning/execution. Deliver an acoustic tooth communicator system for low-visibility operations. Initiate the development of a tactical communications gateway system that can provide repeater services and cross connect capability with different communications sources from multiple agencies in a modular tactical box that can be deployed in austere environments. Initiate development of a capability to connect tactical and commercial operator command and control communications (C4I) devices and accessories through secure wireless signals. Initiate 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. Complete delivery of a 20 pound micro tactical ground robot capable of negotiating rugged terrain and climbing complex obstacles for visual and acoustic surveillance and reconnaissance missions and to identify and defeat improvised explosive devices. Complete delivery of a single man-portable, collapsible-wing tactical micro 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. Deliver 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. Deliver a man-portable aerial radar system that can detect unmanned aerial vehicles and ultralights at the tactical edge. Deliver a tactical tethered aerial ISR capability via an indigenous, non-standard mobility platform that provides austere locations with rapid and improved organic situational awareness. Deliver a multispectral augmented visually enhanced reality imaging capability that provides a significant advantage for long range target acquisition in challenging environments. Develop and demonstrate a maritime canister launched small unmanned aerial system for amphibious and maritime operations

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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603122D8Z / <i>Combating Terrorism Technology Support</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>requiring overhead aerial ISR capabilities. Initiate and deliver 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. Deliver a tactical platform marking kit capable of discretely tagging stationary and moving targets for tracking with legacy night vision devices. Deliver 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. Deliver an underwater vision enhancement device for ship hull inspections in turbid water and for maritime to land operations. Deliver an extremely low volume, low profile, concealable GPS logger. Initiate development of a non-pyrotechnic diversionary device that will mitigate collateral damage in confined spaces. Initiate development of a maritime command, control, and tracking capability for surface craft, surface swimmers, and deployed divers. Initiate development of a Multi-Role Thermal Survivability System (MRTSS) to support tactical operators conducting aviation, ground mobility, and first responder combating terrorism (CbT) missions.</p> <p>FY 2016 Plans: Deliver a lightweight intermediate caliber cartridge utilizing polymer material technologies to reduce combat load and enhance terminal ballistics. Deliver a 5.56mm polymer round to reduce weight for standard issue rounds, enhancing combat effectiveness and reducing warfighter fatigue and cost. Deliver a lethal miniature aerial munition system (LMAMS) with substantially improved maneuverability, attack angle, loiter time, and lethality with a full mission profile flight training variant. Deliver a tactical communications gateway system that can provide repeater services and cross connect capability with different communications sources from multiple agencies in a modular tactical box that can be deployed in austere environments. Deliver a capability to connect tactical and commercial operator command and control communications (C4I) devices and accessories through secure wireless signals. Deliver 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. Deliver a non-pyrotechnic diversionary device that will mitigate collateral damage in confined spaces. Deliver a maritime command, control, and tracking capability for surface craft, surface swimmers, and deployed divers. Deliver a Multi-Role Thermal Survivability System (MRTSS) to support tactical operators conducting aviation, ground mobility, and first responder combating terrorism (CbT) missions.</p>			
<p>Title: TRAINING TECHNOLOGY DEVELOPMENT</p> <p>Description: The TTD Subgroup’s objective is to provide SOF, DoD, and the interagency community with an agile, rapid response, R&D process and SME resource for increasing readiness for tomorrow’s threats. To meet this objective, the subgroup focuses on immersive simulations; augmented reality; advanced training content programs; rapid and adaptive learning environments; and mobile technology.</p> <p>FY 2014 Accomplishments: Completed evaluation of a program designed to improve a soldier’s kinetic eye movement and target acquisition skills and expanded to an OCONUS evaluation. Completed enhancements to the existing Minigun simulator system. Completed</p>	9.626	10.183	6.900

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>development of a validated negotiations model for negotiation skills in high stakes situations with additional CONUS and OCONUS users. Completed installation and evaluation of an additional immersive parachute simulation system for practicing military free fall emergency procedures. Completed development and evaluation of a PC-based simulation tool to train technical and tactical embassy security skills. Initiated development of models and a training capability for 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 IEDs and breaching charges. Completed development of software models and a mobile application to train features and functions of non-standard and foreign weapons. Completed development of a software solution for a digital interactive visual dictionary (DIVD) and user training to be used in an environment that allows instructor cadre role players and students to interact with data visually to increase and enforce learning, retention, and recall capabilities. Completed development and implementation of interactive, video-based simulator training scenarios to enhance situational awareness and decision-making for novice and experienced law enforcement personnel during and immediately following incident response. Initiated analysis, design, and development of an advanced game engine interface and additional 3D virtual target and range models to support advanced simulation training for mission readiness and risk reduction for military personnel. Initiated design of a system of systems that integrates psychological, physiological, and behavioral information and technology to predict and enhance human physical performance. Initiated development of a system and simulation that enables training for the tactical employment of task organized forces to conduct operations supporting efforts to combat transnational organized crime. Completed development and evaluation of a course on the topic of 802.11 standards and signature reduction for civilian law enforcement. Completed development of a Digital Interactive Survival, Evasion, and Recovery Manual (SERE Manual) iBook and eBook that provide a digital interactive Survival training environment for Service members to prepare for operations in a counter-terrorism environment. Completed development of a mobile version of a field interview card for use by law enforcement when collecting information about objects and people. Completed development of a simulation based training package to enhance squad leader decision making in high stress environments. Initiated design and development 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/stability missions. Initiated design of three-dimensional ordnance models for a scalable, immersive, online learning environment using COTS technology. Completed an analysis and equipment selection to enhance maritime surveillance technology and skillsets for personnel to illuminate IED networks.</p> <p>FY 2015 Plans: Complete development and implementation of a training capability for 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 IEDs and breaching charges. Complete development and evaluation of an advanced game engine interface and additional 3D virtual target and range models to support advanced simulation training for mission readiness and risk reduction for military personnel. Initiate Development of enhancements for a live fire target simulation training system for developing and maintaining long range shooting skill sets. Complete development and evaluation of a system of systems that integrates psychological, physiological, and</p>			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>behavioral information and technology to predict and enhance human physical performance. Continue design and development of a system and simulation that enables training for the tactical employment of task organized forces to conduct operations supporting efforts to combat transnational organized crime. Complete 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/stability missions. Complete development of three-dimensional ordnance models and implement models into a scalable, immersive, online learning environment using COTS technology. Initiate design of a technology research, integration, and development test bed to optimize current shooting simulation technology and training methodology, integrate dissimilar separate systems to form a common, scalable, SOF training and simulation architecture, and demonstrate the integrated simulation benefits to the SOF warfighter. Initiate design and development of a full motion platform that can be mounted on an aerial work platform to replicate air/boat movement for marksmanship training. Design and develop scenario-based training to provide analysts with enhanced capabilities for detecting activities and facilities of interest. Initiate development of low-cost robotic targets that move autonomously on a live-fire training range to enhance marksmanship skills and decision making. Initiate design and development of a training and performance support tool for use on mobile devices in operational environments. Initiate design and development of a suite of augmented reality tools for mobile wearable platforms.</p> <p>FY 2016 Plans: Complete development and implementation of a system and simulation that enables training for the tactical employment of task organized forces to conduct operations supporting efforts to combat transnational organized crime. Complete development and implementation of enhancements for a live fire target simulation training system for developing and maintaining long range shooting skill sets. Complete development of a technology research, integration, and development test bed to optimize current shooting simulation technology and training methodology, integrate dissimilar separate systems to form a common, scalable, SOF training and simulation architecture, and demonstrate the integrated simulation benefits to the SOF warfighter. Complete the development and evaluation of a full motion platform that can be mounted on an aerial work platform to replicate air/boat movement for marksmanship training. Complete development and implement scenario-based training to provide analysts with enhanced capabilities for detecting activities and facilities of interest. 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.</p>			
Accomplishments/Planned Programs Subtotals	98.197	94.541	71.171

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

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E. Acquisition Strategy

N/A

F. Performance Metrics

N/A

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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	-	22.000	21.782	-	21.782	21.643	25.753	26.448	27.173	Continuing	Continuing
P313: <i>Foreign Comparative Testing</i>	0.000	-	22.000	21.782	-	21.782	21.643	25.753	26.448	27.173	Continuing	Continuing

Note

The Foreign Comparative Testing (FCT) Program Element (PE) 0603133D8Z is recast with a focus on Pre-Engineering and Manufacturing Development (Pre-EMD) and Proof of Principle prototypes derived from evaluation of foreign equipment that will provide the United States Armed Services, Special Operations Command (SOCOM) and defense agencies, capabilities to counter emerging threats. The program will increase its focus on foreign technology solutions that affordably extend the life of existing military platforms/capabilities and enhance interoperability with foreign partners and between services. FCT's broad reach across our allies and friendly foreign countries will enable development of innovative, cost effective, and potentially interoperable solutions for the Department of Defense, Multi-Service and Combatant Command (COCOM) priority requirements. FCT also enables more effective competition between U.S. and foreign technologies.

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 from allied nations and coalition partners to counter emerging threats, thereby accelerating the United States acquisition process and lowering development costs. FCT enhances interoperability, facilitates international collaboration, expands opportunities for prototyping to identify significant technology maturation, 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). The FCT projects are sponsored by the Department, Services and SOCOM. 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 the development of a roadmap to incorporate results into Defense programs.

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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	-	30.000	15.363	-	15.363
Current President's Budget	-	22.000	21.782	-	21.782
Total Adjustments	-	-8.000	6.419	-	6.419
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-8.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	6.481	-	6.481
• Economic Assumptions	-	-	-0.062	-	-0.062

Change Summary Explanation

Funds were added to provide emphasis on Proof of Principle and Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes derived from evaluation of foreign equipment.

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603133D8Z / <i>Foreign Comparative Testing</i>				Project (Number/Name) P313 / <i>Foreign Comparative Testing</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P313: <i>Foreign Comparative Testing</i>	-	-	22.000	21.782	-	21.782	21.643	25.753	26.448	27.173	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Foreign Comparative Testing (FCT) program supports the warfighter by leveraging advanced technologies and equipment from allied nations and coalition partners to counter emerging threats, thereby accelerating the U.S. acquisition process and lowering development costs. FCT enhances interoperability, facilitates international collaboration, expands opportunities for prototyping to identify significant technology maturation, 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). The FCT projects are sponsored by the Department, Services and U.S. Special Operations Command (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 the development of a roadmap to incorporate results into Defense programs.

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 the qualified foreign item in the United States. Other nations recognize the long-term value of such practices for competing in the United States 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 across 34 states benefited from FCT projects.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Lightweight M3A1 Recoilless Rifle (Army)	-	1.633	0.175
Description: The current M3 Carl Gustaf Recoilless 84 millimeter Rifle was introduced to U.S. forces in 1991. The original version used a thin steel barrel liner containing the rifling, strengthened with a carbon fiber outer sleeve. External steel parts were eventually replaced with aluminum alloys or plastics thereby reducing the weapon weight from 36 pounds to 21 pounds. This M3A1 project will eliminate six pounds (28 percent) from the existing system by replacing the existing steel tube with a titanium alloy tube, and other various components (bolt, trigger, venturi, and ancillary parts) without changing the firing procedures, operations or ammunition. Since the weapons' operational characteristics will not be changed, this low risk approach will produce a lighter weight 84mm shoulder-fired weapon without going through a costly and time consuming process to test, qualify, and re-certify an entirely new modernized weapon system. This is a continuing project previously funded in FY 2014 in PE 0605130D8Z.			
FY 2015 Plans:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Conduct engineering analysis/study, analyze vendor data, conduct technical testing, and perform operator/user assessment test during 2Q FY 2015. FY 2016 Plans: Write test reports, prepare decision packet and close-out report during 4Q FY 2016.				
Title: Mobile Gunnery Live Fire Monitoring System (MGLFMS) (Navy) Description: The project will test and evaluate 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, make instantaneous corrections, and provides recording capability for detailed after action reviews. Foreign data has shown that training with this system significantly increases probability of gunnery crews placing first round on target. The system also provides an essential tool for instructors to evaluate and make the necessary feedback to ensure the analytical abilities that encompasses all the gunnery skills required for accurate fire. Several North Atlantic Treaty Organization (NATO) allies currently train with this same equipment. This is a continuing project which was previously funded during FY 2014 in PE 0605130D8Z. FY 2015 Plans: Receive Phase I test articles during 1Q FY 2015. Initiate Phase I Technical Testing throughout 1Q – 3Q FY 2015. Receive Phase II test articles during 3Q FY 2015. Initiate Phase II Performance Testing during 3Q FY 2015. Initiate Phase II Field User Evaluation during 4Q FY 2015. FY 2016 Plans: Complete Phase II Performance Testing during 1Q FY 2016. Complete Phase II Field User Evaluation during 2Q FY 2016. Receive Phase III test articles in 3Q FY 2016. Initiate Phase III Performance Testing and initiate Phase III Field User Evaluation during 3Q–4Q FY 2016. Finalize technical test report, closeout report, and provide procurement decision by the end of 4Q FY 2016.		-	1.000	0.594
Title: Low Cost Innovative Projects (Projects Less Than One Million Dollars Each): Description: Energy Absorbing Material for Improved Blunt Impact/Trauma Protection (Army); Solar Power Shelter System (Army); Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) Radio Frequency Amplifier (RFA) (Navy); Automatic Target Recognition (ATR): Reducing MK18 Unmanned Underwater Vehicles (UUV) Mine Countermeasures Tactical Timeline (Navy); Computer Network Defense (CND) Advanced Persistent Threat (APT) Detection (Navy); H-1 Crash-resistant, Ballistic-tolerant, Fuel Cell Qualification (Navy); Horizon Reference System (HRS), Electroluminescent Panel Replacement (Navy); Rapid Airfield Damage Assessment System (RADAS) (Air Force); and Electronic Underwater Navigation (USSOCOM). These continuing projects were previously funded during FY 2014 in PE 0605130D8Z.		-	4.790	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2015 Plans:</i> Procure test articles and conduct testing for Energy Absorbing Material for Improved Blunt Impact/Trauma Protection, a soft flexible material that stiffens upon impact for use in helmets and body armor to reduce blunt impact forces. Procure test articles and conduct testing for Solar Power Shelter System, a new capability which utilizes renewable energy technology (solar power) as an alternative energy source to diesel fuel for powering equipment supporting Army base camps. Conduct operational testing and prepare test report for Rapid Airfield Damage Assessment Systems, a project to test and evaluate a system that detects airfield damage or objects on runways/taxiways that will damage aircraft. Provide an evaluation report for Deployable Instrument Landing System, equipment that combines glideslope and localizer information together to provide azimuth and elevation directions to approaching aircraft. Complete equipment procurement for Advanced Mobile Universal Electrical Tester, a mobile, modular, piece of automated test equipment used to collect test parameters of complete sub-system(s) under both depot and operational maintenance environments. Complete testing for Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) Radio Frequency Amplifier (RFA), a project that tested and evaluated the Communication RFA Shop Replaceable Unit (SRU). Perform final evaluation and make procurement decision on Automated Target Recognition: Reducing MK18 Unmanned Underwater Vehicles (UUV) Mine Countermeasures Tactical Timeline, system capable of automatically identifying mine-like targets in sonar imagery from the in-service MK18 Family of UUV Systems. Conduct initial testing and finalize comprehensive test plan for Computer Network Defense (CND) Advanced Persistent Threat (APT) Detection, a project that evaluated software that will address advanced persistent threats (APTs), which is a current capability gap in the CND program of record. Conduct Phase I and II testing for H-1 Crash-resistant, Ballistic-tolerant, Fuel Cell Qualification, a project that tests and evaluates crashworthy self-sealing fuel cell technology to U.S. military standards for use on the UH-1Y and AH-1Z aircraft. Perform testing and provide evaluation reports for Horizon Reference System Electroluminescent Panel Replacement, a systematic upgrade to modernize the existing electroluminescent (EL) Panel Bar to Light Emitting Diode (LED) Technology on the shipboard Horizon Reference Set. Receive test articles, conduct safety and technical testing for Electronic Underwater Navigation, a project that assures the certainty of combat divers arriving at the intended assigned target, using an extremely accurate underwater navigation system.</p>			
<p><i>Title:</i> FCT FY 2015/2016 Focal Area: Force Application</p> <p><i>Description:</i> FCT will invest in cross-domain, innovative Force Application technologies for new and emerging capabilities with international partners, including but not limited to these Defense-wide requirements that are consistent with strategic priorities: Anti-Access/Area Denial (A2/AD); Robotics and Autonomous Systems; Interoperability across Platforms and Systems; and Countering Unmanned Systems.</p> <p><i>FY 2015 Plans:</i> During FY 2015, FCT will focus on selecting projects supporting the below Force Application Areas:</p>	-	6.577	7.003

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>-Anti-Access/Area Denial (A2/AD) will provide innovative technologies that enhance position, navigation and timing accuracies, improve targeting/delivery in Global Positioning System (GPS)-denied environments and prevent exploitation of systems lost in denied areas (e.g., anti-tamper capabilities).</p> <p>-Robotics and Autonomous Systems will remotely control assets that reduce troop tasks and exposure for daily operations, including force protection, special operations, and detection.</p> <p>-Interoperability across Platforms and Systems 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.</p> <p>-Countering Unmanned Systems (Unmanned Aerial Vehicles (UAVs), Unmanned Underwater Vehicle (UUVs), and Unmanned Surface Vehicles (USVs)) will provide technologies that detect, monitor, and counter hostile threats with small signatures, including special operations missions in surface, underwater and onshore environments.</p> <p>FY 2016 Plans: During FY 2016, FCT will focus on selecting projects supporting the below Force Application Areas:</p> <p>-Anti-Access/Area Denial (A2/AD) will provide innovative technologies that enhance position, navigation and timing accuracies, improve targeting/delivery in GPS-denied environments and prevent exploitation of systems lost in denied areas (e.g., anti-tamper capabilities).</p> <p>-Robotics and Autonomous Systems will remotely control assets that reduce troop tasks and exposure for daily operations, including force protection, special operations, and detection.</p> <p>-Interoperability across Platforms and Systems 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 are portable, modular, partitioned, scalable, extendable, and secure.</p> <p>-Countering Unmanned Systems (Unmanned Aerial Vehicles (UAVs), Unmanned Underwater Vehicle (UUVs), and Unmanned Surface Vehicles (USVs)) will provide technologies that detect, monitor, and counter hostile threats with small signatures, including special operations missions in surface, underwater and onshore environments.</p>			
<p>Title: FCT FY 2015/2016 Focal Area: Force Logistics</p> <p>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.</p> <p>FY 2015 Plans: During FY 2015, FCT will focus on selecting projects supporting the below Force Logistics Areas:</p>	-	4.000	7.005

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>-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.</p> <p>-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.</p> <p>-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.</p> <p>FY 2016 Plans: During FY 2016, FCT will focus on selecting projects supporting the below Force Logistics Areas:</p> <p>-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.</p> <p>-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.</p> <p>-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.</p>			
<p>Title: FCT FY 2015/2016 Focal Area: Force Support</p> <p>Description: FCT will invest in cross-domain, innovative Force Support evaluation of new and emerging capabilities with international partners, including but not limited to these Defense-wide requirements that are consistent with strategic priorities: Increase Human Performance, and Training Systems.</p> <p>FY 2015 Plans: During FY 2015, FCT will focus on selecting projects supporting the below Force Support Areas:</p> <p>-Increasing human performance involves developing and demonstrating advanced technologies to assess and optimize human cognitive load during combat operations and training. Increasing human performance will also utilize cognitive-load assessment technologies to enhance training of tasks with high cognitive load such as in aviation operations, combined arms engagements, mission command, air and missile defense, or multiple intelligence sensor training.</p> <p>-Training Systems will demonstrate augmented reality capability that allows representation of fixed objects from a synthetic terrain environment and ability to overlay those objects within the augmented reality display.</p> <p>FY 2016 Plans:</p>	-	4.000	7.005

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603133D8Z / <i>Foreign Comparative Testing</i>	Project (Number/Name) P313 / <i>Foreign Comparative Testing</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>During FY 2016, FCT will focus on selecting projects supporting the below Force Support Areas including emerging Science and Technology challenges:</p> <ul style="list-style-type: none"> -Communication and Sensor Performance: Development of broad-band sensing systems, non-satellite long-range communication systems, and prototyping of enabling technologies for over the horizon radar (OTHR). -Increasing human performance involves developing and demonstrating advanced technologies to assess and optimize human cognitive load during combat operations and training. Increasing human performance will also utilize cognitive-load assessment technologies to enhance training of tasks with high cognitive load such as in aviation operations, combined arms engagements, mission command, air and missile defense, or multiple intelligence sensor training. 			
Accomplishments/Planned Programs Subtotals	-	22.000	21.782

C. Other Program Funding Summary (\$ in Millions)

N/A

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 US 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 2014, FCT had a transition rate of 64 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 with anticipated impact being greater.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603225D8Z I <i>Joint DOD/DOE Munitions Technology Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	37.366	18.595	19.308	18.802	-	18.802	18.867	18.935	19.078	19.335	Continuing	Continuing
P225: <i>Joint DOD/DOE Munitions</i>	37.366	18.595	19.308	18.802	-	18.802	18.867	18.935	19.078	19.335	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 Department 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603225D8Z I <i>Joint DOD/DOE Munitions Technology Development</i>
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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).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603225D8Z I <i>Joint DOD/DOE Munitions Technology Development</i>
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- 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. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	19.292	19.335	19.514	-	19.514
Current President's Budget	18.595	19.308	18.802	-	18.802
Total Adjustments	-0.697	-0.027	-0.712	-	-0.712
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.009	-			
• SBIR/STTR Transfer	-0.688	-			
• Realignment for Higher Priority Programs	-	-	-0.659	-	-0.659
• FFRDC SEC 8104	-	-0.027	-	-	-
• Economic Assumptions	-	-	-0.053	-	-0.053

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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*

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD Bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603225D8Z / <i>Joint DOD/DOE Munitions Technology Development</i>	Project (Number/Name) P225 / <i>Joint DOD/DOE Munitions</i>
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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 2014	FY 2015	FY 2016
<p>Title: Computational Mechanics and Material Modeling</p> <p>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.</p> <p>The specific projects in computational mechanics and material modeling are:</p>	6.838	5.703	5.588

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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. - Energetic materials and polymers under dynamic and thermal loading. - Fragment impact and response experiments. <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Completed Taylor impact investigation examining the friability of explosives and propellants. This work is a required step to quantifying damage in explosives relevant to high explosive (HE) safety assessments. A broad range of explosives and propellants were included such that material-to-material variations could be investigated. - Completed energetics damage experiments, including rubbery tear, interfacial damage, friability, and shear-dominated impact experiments, on PBX 9501 and Composition B explosives with accompanying simulations. This work is critical to determining a HE ignition criterion under dynamic impact events. - Completed analysis of PBXN-9 data set to provide consistent parameter sets for DoD and the DOE codes. - Performed impact and direct initiation experiments on off-specification PBXN-9 to ascertain change in performance and safety. - Launched larger-diameter steel balls into PBX 9502 targets to collect data for Generalized Initiation Criteria. - Incorporated shear into two-component localization model to move toward a general damage model capability. - Developed and applied methods to incorporate three-dimensional microstructure data into continuum calculations. - Responded to and provided support for 300-400 inquiries to the ALE3D help line. Distributed ALE3D 4.20 code suite to approximately 50 sites. - Released ALE3D with improvements in updated high explosive lighting times, with detonation shock dynamics as the analysis progresses. - Developed User Defined Functions (UDF) for “plug-in” material models. - Provided ability to seed damage initiation sites to Polycrystalline models for capturing spall failure. - Implemented rate-sensitive damage model into ALE3D validated against experimental data. - Completed initial manufacturing variable study of composite materials. - Finished Nano-indentation tests on samples prepared from the standard filament wound carbon fiber tube in FY 2014. - Enhanced the ALE3D/ALE3D code coupling through FEusion interface by providing a parallel implementation. - CTH Version 11.0 released with several new constitutive models. - Implemented robust and accurate coupling between Sierra/Structural Mechanics (Sierra/SM) and CTH, including documented examples. - Sierra/SM released 4.32 in April 2014. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Performed experiments on detonation propagation through inert materials. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Transition Mechanically Activated Thermal Chemistry (MATCH)-ignition model to DOE code teams. - Develop capability to launch fragment with multiple impact points. - Complete integrated 3D damage simulation w/ mesoscale input for CartaBlanca calculation. Begin transition of CartaBlanca as general tool for use in typical DoD weapon calculations. - Complete supporting experiments on quasi-static shear localization, in situ 3D damage evolution, and mini-bulge damage test and interaction with modeling community regarding results. - Enhance ALE3D code capabilities through continued development of implicit multi-physics. - Develop improved continuum models that couple void nucleation to shear band failure. - Enhance the modeling of material failure and fragmentation via void insertion coupled directly through the GursonD model. - Account for dynamic strength increase characterized by modeling and simulation with theoretical treatment available in internal prerelease ALE3D. - Characterize shock and damping response of commonly used carbon fiber materials, and explore relevant modeling techniques. - Test munition representative filament-wound carbon fiber composite tubes using a split Hopkinson apparatus. - Demonstration of structural collapse capabilities utilizing Sierra/CTH coupling with advanced material modeling capabilities. - Release CTH Versions 11.1 and 11.2 with improved reactive flow modeling, enhanced algorithms for multimaterial behavior, and emphasis on hardware, software environments for developing/emerging technologies for use with CTH. - Sierra/SM versions 4.36 and 4.38 planned for FY 2015 release. - Design and conduct new experiments to further validate or refine the Generalized Initiation Criterion. - Perform experiments utilizing near-field High Energy Diffraction Microscopy (HEDM) and tomography on void nucleation in titanium. - Complete supporting experiments on quasi-static shear localization, in situ 3D damage evolution, and mini-bulge damage test and interaction with modeling community regarding results. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Final report on experimental quantification of microstructure, interfaces, and damage in relation to mechanical behavior for energetic materials. - Glassy Amorphous Polymer (GAP) Damage model transition 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). 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Demonstration of Uncertainty Quantification (UQ) Capabilities in Sierra coupled codes through integration with the Sierra user interface (UI). - 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 UI. - Release CTH versions 11.3 and 12.0. Incorporate exascale improvements in version 12.0. 			
<p>Title: Energetic Materials (EM)</p> <p>Description: The goals of this technical focus area are to develop new 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 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.</p> <p>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.</p> <p>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.</p>	4.162	5.364	4.949

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>The desire for smaller and lighter munitions is driven in large 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 and safety.</p> <p>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. We may also need to develop new, more robust EMs that survive impact loads while maintaining lethality and initiability.</p> <p>The specific projects in the energetic materials technical focus area are:</p> <ul style="list-style-type: none"> - Synthesis, properties, and scale-up of new energetic compounds. - Insensitive munitions and surety. - Cheetah thermochemical code development and experiments. - 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. - Electromagnetic response of energetic materials. <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Investigated the complex permittivity of PBX 9502, Composition B (CompB) and IMX 101 under x-ray exposure. - Performed burn rate studies on promising burn rate modifiers including tetranitroimidazole (N4BIM) salts. - Captured reaction (ignition) front measurements in damaged energetic materials. - Performed porous and pristine minimum signature propellant (MSP) shock initiation experiments for recompaction ignition of damaged material detonation transition model. - Synthesized 25-50 grams of LLM-196 and LLM-198 and their nitrogenous salts for evaluation by Navy partners. - Characterized the damage evolution of PBX 9502 and Ammonium Perchlorate (AP) propellant, including the determination of permeability as a function of temperature history. - Synthesized the target explosive compounds LLM-212, LLM-215, LLM-217, and LLM-221 scaled-up to the 10 grams level, and the compounds characterized by small-scale safety test, density, and heat-of-formation measurements. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Based on data from One-Dimensional Time to Explosion (ODTX) and Sandia Instrumented Thermal Ignition (SITI) experiments, developed an ignition model for PBX 9502 that replicates the effects of ullage and venting over a range of conditions. - Completed development of Ignition and Growth reactive flow model parameterization for a Minimum Signature Propellant. - Completed short-pulse shock initiation in HMX-based explosives with reactive meso-scale simulations. Delivered completed Disc Acceleration eXperiment (DAX) design for conventional energetic materials. - Continued validation of post-detonation carbon kinetics and application to cylinder experiments for carbon rich explosives. - Continued development of bismuth and antimony thermochemistry, and expanded alkaline thermochemistry. - Developed a deposition condition that allows higher throughput deposition of hexanitrostilbene (HNS) with film thickness >200 μm and thick enough to detonate. - Reported on chemical interactions that control thermal response of IMX-104 (Army Explosive), aging of RDX (DoD Explosive), processes that control release of reactive oxygen in KClO4 pyrotechnic oxidizers, and interaction between FOX-12 and RDX (Navy Propellants). - Delivered report on burn rate studies on promising burn rate modifiers including tetranitrobiimidazole (N4BIM) salts. - Conducted pre-ignition x-ray experiments on IMX-104 and Comp B explosives to help inform potential replacement issues. - Dynamic radiographic experimental series performed on PBX 9502 explosive to interrogate insensitivity mechanism. - Determined conditions for multiple material (e.g., co-crystal) formation and test for homogeneous or heterogeneous nucleation. - Reported on interaction between two Navy Propellants. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Deliver a fully integrated, electromagnetic, heat transport, kinetic, mechanical, and hydrodynamic, model for down-selected energetic materials. - Report on the overall performance results for shock and thermal initiation, including environmental effects, model predictions, etc. of down-selected energetic materials. - Investigate the sensitivity properties of synthesized C, H, N, O oxidizers. - Systematically evaluate and improve code predictions at low pressure/high temperature for specific impulse calculations and gun propellants by expanding library of gaseous and condensed products available for such calculations, as well as available ingredients. - Benchmark High Explosive Reaction to Mechanical Stimulus (HERMES) model to sub-detonative fragment impact response experiments. - Perform cook-off-induced Deflagration to Detonation Transition (DDT) experiments. - Deliver completed DAX design for non-ideal EMs. - Scale-up the synthesis of new compounds (e.g., LLM-200, LLM-196, LLM-198, LLM-175 and LLM-201) to produce 20-30 grams for performance testing and heat-of-formation measurements. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<ul style="list-style-type: none"> - Understand effects of incorporated metal films on propagation and detonation phenomena. Complete experiments on incorporation of metal films; one metal, two configurations, into deposited explosive. - Publish best available models and SITI data for pressure dependence and gas generation rates of thermal decomposition of a representative MSP and Pentaerythritol tetranitrate (PETN). - Complete aging study of underwater explosive formulations and/or ingredients. - Investigate reactive processes that occur during shock loading of PETN and/or HNAB. - Perform MSP shock initiation experiments on pristine and damaged powder for Unknown-to-Detonation Transition (XTD) model. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Synthesize and characterize new tri-, quadri-, and penta-cyclic oxadiazoles as both high-power and insensitive target molecules. - Experimentally correlate burn rates to thermal damage state and publish results. - Experimentally benchmark High Explosive Response to Mechanical Stimulus (HERMES) sub-detonative response model, including sensitivity study. - Deliver first kinetics tool for non-ideal energetic materials (Front Curvature). - Model DAX data together with kinetics data, enabling Jones-Wilkins-Lee Equation-of-State model (JWL ++) validation. - Release Cheetah 8.0 code. - Report on initiation properties study on deposited explosive. - Report demonstrating use of laser heating and fast mass spectrometry to investigate ignition in energetic materials. - Characterize polymeric energetic binder candidates. - Full dynamic radiographic comparison of CompB and IMX 104 explosives. 			
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Title: Initiators, Fuzes, and Sensors	3.104	3.668	3.645
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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

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B. Accomplishments/Planned Programs (\$ in Millions)

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 for 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 for FY 2015).

FY 2014 Accomplishments:

- Delivered data packages on DoD detonators to the respective technical POCs as the tests were completed.
- Built and released tabular equation of state (EOS) for CL-20 explosive.
- Demonstrated electrochemical modeling for a single-cell battery within the Sierra code framework.
- Demonstrated methodology for using microstructural data and performance data in grain-scale and continuum simulations.
- Performed microstructural characterization of CL-20 and HMX.
- Validated ALEGRA-MHD, magneto hydrodynamics, simulations of flyer launch for Explosive Foil Initiators (EFIs).
- Optimized tape-cast barium titanate (BTO) device using nanoparticle precursors.
- Developed platform and process for measuring the permittivity of discrete nanoparticles in solution.
- Completed several major capability enhancements to the Thermally Activated Battery Simulator (TABS) software. Building on the previous thermal system modeling capability, TABS V3, includes support for center hole fired geometries, burn front modeling of battery activation and electrochemistry prediction.
- Fired two additional gas-gun shots for high-pressure, unreacted LX-17 explosive to establish shock Hugoniot.
- Tested three commercial Number-eight Blasting Caps.
- Released series of packaging design guides covering material characterization, component residual stress, fuze residual stress, coupled physics stress, and model validation experiments.

FY 2014	FY 2015	FY 2016

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Applied Shock Wave Image Framing Technique (SWIFT) diagnostic to study the performance of Hiper detonator housings containing a variable density of RSI-007 high explosive. - Identified and integrated new laser backlight into SWIFT. - Completed series of experiments at the Advanced Photon Source (APS) to study the interaction between initiators and detonator explosives with the goal to definitively establish initiation mechanisms. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Measurement of temperature dependent impedance of battery separator as a function of applied load. - Delivery of desktop code with a Graphical User Interface (GUI) for coupled thermal & mechanical capability for axisymmetric battery geometry materials designed to start explosive decomposition via photo-dissociation. - Perform experiments to assess wave divergence in charge transfer systems by measuring the effect of corner turning on booster diameter for insensitive explosives. - Develop next generation of the four-channel embedded Fiber Bragg Grating (FBG) for detonation wave diagnostics. - Determine the performance parameters, including combustion and detonation, deposition surface mobility and susceptibility to boundary conditions of energetic materials deposited using microelectromechanical systems (MEMS) compatible techniques. - Develop tabular equations of state for explosives, e.g., TATB, PETN and binder/HE combinations, e.g., RSI-007, PBX's. - Assess performance of encapsulated components in fuze-like geometries in quasi-static and dynamic environments. - Develop lower-divergence 980 nanometer emitter arrays for Vertical-Cavity Surface-Emitting Laser (VCSEL) based proximity fuze. - Develop low-divergence VCSEL emitters that enable two times improvement in array pitch density, four times greater power. - Unreacted Hugoniot measurements using gas-gun on LX-17 and IMX-101 explosives. - Demonstrate high-Weibull modulus electric breakdown behavior in chemically thinned glass dielectrics and scale Weibull parameters to designed multilayer glass capacitor (MLGC). - Demonstrate multilayer processing technology for glass dielectrics to produce 20nF capacitors able to withstand 2000Vdc. - Determine continuum burn model parameters for detonator-grade explosives. - Report summarizing sensor parameter space coupled with customer weapons guidance requirements. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Deliver modeling capability of coupled thermal, mechanical and electrochemical simulation for a single cell battery. - Plan experiments required to validate coupled models at the battery scale. - Use spot-size data to extend James Model to account for area effect in LX-10, LX-16, and EDF-11 explosives. - 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 small-scale shock experiments on energetic materials for equation of state and burn model validation. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Improved equations of state and conductivity models for electrical bridge elements, aluminum, copper, gold, nickel, etc. - Build prototype 200nF multilayer glass capacitors that can withstand 2000Vdc. - Determine statistical basis and initial algorithm for generating threshold curves from detonator experimental data. Determine whether task may proceed based on findings. - Completion of Particle Imaging Velocimetry (PIV) diagnostic development. - Fabricate custom Si Avalanche PhotoDetectors (APDs) optimized for low-voltage performance and integration for the Photonic Proximity Fuze (PPF) sensor. - Demonstrate in thin-film thermal battery 500mA/cm2 performance with <0.5V polarization at 525C. 			
<p>Title: Warhead and Penetration Technology</p> <p>Description: This focus area supports the development of new warheads and penetrator weapons through advances in materials processing and characterization, instrumentation, and computational codes. In recent years there have been significant increases in warhead performance 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 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.</p> <p>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.</p> <p>The specific projects in the warhead and penetration technology focus area are:</p> <ul style="list-style-type: none"> - Multiphase blast munitions (MBX) technology. - Dynamic behavior of sand. - 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. 	3.487	3.509	3.349

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>- Controlled effects warhead materials.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Completed baseline data collection on alloy steel 4340, titanium, and copper to determine the effects that geometric scale, shell thickness (strain rate), heat treatment / annealing states and defect density have on fragment size, homogeneous background strain, and time to fragmentation. - Completed oblique high explosive-driven shock hardening and damage microstructural quantification on tantalum, zirconium, and completed initial oblique HE-driven spall on U-6Nb. - Implemented TEnsile PLAsticity (TEPLA) model into CartaBlanca and compared improved representation of plate impact response to Lagrange code representation. - Conducted a parametric study on the laser-based shock experiments using ALE3D with microstructures generated through Particle Pack. - Completed cylinder-expansion and perforation-test simulations using Sierra Solid Mechanics and assessed the capability of peridynamics for this class of problems. - Implemented a methodology that has shown to be stable in solving the Multifield model equations. - Incorporated the second iteration of the multifield theory into CTH with advanced Lagrangian and Eulerian numerics. - Completed feasibility study of methods to measure or calculate the full projectile trajectory into complex targets. - Designed new ball-screw torsion bar to preclude spurious bending modes for dynamic interfacial friction measurements. - Developed analytical method that computes the energy transferred and dissipated across a threaded interface due to impact tension loads in the time and frequency domains. - Completed terminal ballistic validation studies using penetration data obtained from experiments. In these PeriDynamics MultiScale (PDMS) simulations, the high strength concrete target material was discretized into multiple scales. - Reported model implementation in the GEODYN material library as well as results of Verification and Validation (V&V) using scaled penetrator tests; delivered an improved constitutive model to the GEODYN material library. - Updated GEODYN model for ALE3D full-scale penetration simulations. - Performed cylinder expansion and perforation simulations, documented analyses, and assessed Kraken code capabilities. - Processed first batch of 4340 steel powder samples with low melting point Cu-Sn bronze powders using additive manufacturing methods. - Analyzed iron phase-transition data collected at Dual-Axis Radiography Hydrodynamic Test facility (DARHT) with results submitted for publication in the Journal of Applied Physics. - Improved the imaging IR (Infra-Red) full-field temperature diagnostic, incorporating simultaneous emissivity, and radiance measurement. - Added several improvements to ALE3D's multiphase model. These include: Dense-Transitional-Dilute drag law, Pressure gradient force term, Particle-particle interaction model, second order interpolation of fluid quantities to particle location, Two- 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>way momentum and energy coupling between particles and fluids, Spherical and cylindrical domain decomposition, and Bundled communication of particles between domains.</p> <ul style="list-style-type: none"> - Completed initial sweeping shockwave experiment on zirconium. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Investigate the jet formation melting of eutectic Ag-Cu to probe the effects of allotropic and thermal phase transitions. - Complete oblique HE driven shock hardening and damage microstructural characterization on zirconium & copper-lead alloy. - Develop modeling and simulation (M&S) tools that will enable optimization of engineering microstructures with multi-phase material fragmentation. - Implement improvements to the multiphase model in ALE3D. - Complete the incorporation of the multi-field theory into CTH; this will allow for multiple material interactions controlled through internal boundary conditions that are inherent to the numerical techniques. - Complete full-scale simulations into sand and update model. - Develop experimental dynamic friction database containing characterizations of mechanical, shear, compression and tensile, interfaces. - Issue final report on Dynamic Behavior of Sand project. - Simulate Army Armament Research, Development, and Engineering Center (ARDEC) tests with Kraken implemented in Sierra/ Solid Mechanics and document results. - Enable ALE3D version with improved and validated detonics capability informed by meso-scale simulations. - Exercise de-coupled ALE3D Multi-phase Blast eXplosives (MBX) modeling capability to interact with rigid targets. - Simulations of structured architectures with, and without, volume gradients produced through additive manufacturing. - Add Parallel and Adaptive Mesh Refinement to Multifield model. - 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 sphere extrusion testing on nano-crystalline copper and copper-tantalum alloys. - Collect data with speckle imaging on Filled Hemi geometry. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Issue report on technology gaps for interface models. - Complete design of hardware system for trajectory reconstruction or commercial hardware option. - Implement improvements into CTH Material Point Method (MPM) Multifield for penetration problems. - Complete transition of peridynamic capability to Sierra/SM. - Close out Integrated Munitions Modeling and Experimentation project with final documentation. - Produce ALE3D version of MBX model with enhanced multiphase modeling capability. - Exercise ALE3D MBX capability to interact with flexible targets. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Determine the efficacy of additive manufacturing methods. - Inclusion of porosity in fragmentation simulations. - Complete oblique HE-driven shock hardening and damage microstructural characterization on zirconium & copper-lead alloy. - Link Electron BackScatter Diffraction (EBSD) data to Dream3D software for meso-scale model representation of metallic materials. - High magnification IR (Infra-Red) imaging of titanium sample. 			
<p>Title: Munitions Lifecycle Technologies</p> <p>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.</p> <p>The specific projects in the munitions lifecycle technologies focus area are:</p> <ul style="list-style-type: none"> - Predictive Materials Aging, including solder interconnect reliability, corrosion of electronics, and adhesive degradation. - Microelectromechanical systems (MEMS) reliability. - Military use of commercial off-the-shelf (COTS) electronics. - Complex system health assessment. <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Validated bondpad corrosion model with modified plastic encapsulated microelectronics (PEM) parts. - Developed a method for measuring a packaged MEMS device seal strength. - Assessed the role of adhesive swelling due to water absorption on the stress state of the adhesive. - Quantified initial predictive aging and reliability model with results from COTS MEMS device testing. - Developed methodology and software to perform multiple objective assessments of resource allocation and general management strategies of weapon system usage. - Validated a general model to connect condition-based measures, age, environmental factors, at the component level failure mode to system reliability. 	1.004	1.064	1.271

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Collaborated with Army Armament Research, Development, and Engineering Center (ARDEC) to test and validate methodology on 50 caliber round stockpile, and with Aviation and Missile Research, Development, and Engineering Center (AMRDEC) to test and validate methodology on Hellfire missiles. - Demonstrated the ability to measure and computationally predict macroscopic load-displacement response of the napkin-ring joint. - Demonstrated the effectiveness of a commercial coating that contains nickel platelets coated with an electrically insulating material toward tin-whisker mitigation. - Confirmed Dynamic Recrystallization (DRX), and not long-range diffusion, was the controlling mechanism in long tin-whisker and hillock growth using tin-on-silicon test samples, together with focused ion beam (FIB) cross sections. - Demonstrated that spray-coated components exhibit no whiskers after 1,500 cycles (-55 to 85C). <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Develop a software program for general reliability resource allocation problems that will allow the user to understand the robustness of different choices. - Develop a methodology to combine the multiple failure mode models at the component level into an overall model, capable of estimating and predicting system reliability. - Build GUI for connector and bondpad corrosion models. - Assess the role of adhesive swelling due to water absorption on the stress state of the adhesive within the napkin-ring joint and on the stress at failure observed for the joint. - Compile the dormant storage data both internal and external to the Hellfire missile case. - Validate the most promising tin whisker mitigation methods in actual operating environments. - Complete report on MEMS Gyroscope Mechanical Reliability experiments. - Develop 3-D fracture model to evaluate the connection between cracking and residual stress in MEMS packages. - Develop software for identifying best resource allocation for maintenance software and documentation. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Package-on-Package-on-Package (PoPoP) final report and recommendation. - 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 using napkin ring tests to identify additional parameters necessary for predictive model, for example, cure, thermal, and/or dynamic loadings. - Release early prototype of physics-based lifetime predictive model based on Physics of Failure (PoF) approach to the DoD customer. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Software tool for integration Prognostics and Health Monitoring (PHM) and System Assessment (SA) methodologies and strategies, software and documentation.			
Accomplishments/Planned Programs Subtotals	18.595	19.308	18.802

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 2014 there have been 47 transitions to DoD weapons programs and personnel.
2. Attendance and technical interactions at the biannual 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 and papers are tracked and documented.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603288D8Z / <i>Science and Technology (S&T) Analytic Assessments</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	-	12.000	14.645	-	14.645	11.531	13.346	16.946	16.956	Continuing	Continuing
P328: <i>Science and Technology Analytic Assessments</i>	0.000	-	12.000	14.645	-	14.645	11.531	13.346	16.946	16.956	Continuing	Continuing

Note

FY 2015 New Start Program.

A. Mission Description and Budget Item Justification

This Program Element (PE) directly supports the call for developing innovative capabilities to meet the emerging threats in the areas of Anti-Access/Area Denial (A2/AD) environments, missiles, advanced Integrated Air Defense Systems (IADS), surface warfare, warfare from under the sea, counter-terrorism, and counter-Weapons of Mass Destructions (WMD). With cross-domain challenges in areas such as cyber, electronic warfare, space, and Intelligence, Surveillance, Reconnaissance (ISR) outlined in Sustaining U.S. Global Leadership: Priorities for the 21st Century Defense. The S&T analytic assessments performed under this budget item will include the following activities:

- Threat envelope assessments beyond intelligence community products for identifying gaps in U.S. capability for critical threats (Red teaming).
- Independent assessment of critical capability and technology development (Red teaming).
- Architecture development and evaluation to develop new U.S. capability (Blue teaming).
- Experimentation campaigns to demonstrate relevant technologies in preparation for rapidly transitioning the capability, either directly to warfighters, or to acquisition programs (Blue teaming).

Due to the complexity of these capability gaps, the process for developing and executing these analytic assessments will 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 distribution of effort for studies, experiments and prototypes, and testing and integration will be roughly 30/40/30 percent. The first step in the process is to study problems or gaps identified by threat assessments and develop possible solutions; the second step develops those possible solutions into plans for experiments and prototypes; and finally, selected experiments or prototypes may be pursued to more fully develop the solution(s) for operational testing and integration. Implementation of this process could span a couple of years causing the portfolio to cascade from year to year with each effort moving through the phases of study, experiment, and test.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603288D8Z / <i>Science and Technology (S&T) Analytic Assessments</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	-	12.000	12.000	-	12.000
Current President's Budget	-	12.000	14.645	-	14.645
Total Adjustments	-	-	2.645	-	2.645
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	2.678	-	2.678
• Economic Assumptions	-	-	-0.033	-	-0.033

Change Summary Explanation

This is a new start program in FY 2015 to support the higher priorities of acquisition and operations of the Department.

Funds added to expand capability assessments in the areas of Anti-Access/Area Denial (A2/AD) and investments in Defense Innovation Initiatives.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603288D8Z / <i>Science and Technology (S&T) Analytic Assessments</i>	Project (Number/Name) P328 / <i>Science and Technology Analytic Assessments</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P328: Science and Technology Analytic Assessments</i>	-	-	12.000	14.645	-	14.645	11.531	13.346	16.946	16.956	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) directly supports the call for developing innovative capabilities to meet the emerging threats in the areas of Anti-Access/Area Denial (A2/AD) environments, missiles, advanced Integrated Air Defense Systems (IADS), surface warfare, warfare from under the sea, counter-terrorism, and counter-Weapons of Mass Destructions (WMD). With cross-domain challenges in areas such as cyber, electronic warfare, space, and Intelligence, Surveillance, Reconnaissance (ISR) outlined in Sustaining U.S. Global Leadership: Priorities for the 21st Century Defense. The S&T analytic assessments performed under this budget item will include the following activities:

- Threat envelope assessments beyond intelligence community products for identifying gaps in U.S. capability for critical threats (Red teaming).
- Independent assessment of critical capability and technology development (Red teaming).
- Architecture development and evaluation to develop new U.S. capability (Blue teaming).
- Experimentation campaigns to demonstrate relevant technologies in preparation for rapidly transitioning the capability, either directly to warfighters, or to acquisition programs (Blue teaming).

Due to the complexity of these capability gaps, the process for developing and executing these analytic assessments will 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 distribution of effort for studies, experiments and prototypes, and testing and integration will be roughly 30/40/30 percent. The first step in the process is to study problems or gaps identified by threat assessments and develop possible solutions; the second step develops those possible solutions into plans for experiments and prototypes; and finally, selected experiments or prototypes may be pursued to more fully develop the solution(s) for operational testing and integration. Implementation of this process could span a couple of years causing the portfolio to cascade from year to year with each effort moving through the phases of study, experiment, and test.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Science and Technology Analytic Assessments	-	12.000	14.645
Description: Science and Technology Analytic Assessments develops innovative capabilities to meet emerging threats in the areas of Anti-Access/Area Denial (A2/AD) environments, missiles, advanced Integrated Air Defense Systems (IADS), surface warfare, warfare from under the sea, counter-terrorism, and counter-Weapons of Mass Destructions (WMD). Address cross-domain challenges in areas such as cyber, electronic warfare, space, and Intelligence, Surveillance, Reconnaissance (ISR) outlined in Sustaining U.S. Global Leadership.			
FY 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603288D8Z / <i>Science and Technology (S&T) Analytic Assessments</i>	Project (Number/Name) P328 / <i>Science and Technology Analytic Assessments</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>In order to accomplish a balanced program, the target ratios of studies, experiments and prototypes, and testing and integration is planned to be 40/50/10 due to limited results ready for testing in the first year. Accordingly, the following activities are planned for FY 2015:</p> <p>Ongoing study efforts: (base level of analytic effort)</p> <ul style="list-style-type: none"> - 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), and undersea engagements. <p>Studies:</p> <ul style="list-style-type: none"> - Development of analytic tools and analysis for electronic warfare in a complex environment. - Experimental data collection applied to ISR capabilities. - System and technology assessment for warfare from under the sea. <p>Prototyping and Experimentation:</p> <ul style="list-style-type: none"> - Prototype development of an electronic attack capability for a high priority ballistic missile threat. - Prototype development of an electronic attack for a high priority surface naval engagement. - Prototype development of a next generation electronic warfare capability for both air and surface based kill chains. - Development of capability improvement architecture and prototype concept for assured tactical communications. - Prototype development of a next generation broad coverage threat sensor emulator. <p>Testing:</p> <ul style="list-style-type: none"> - Threat Sensor Emulator Data Collection <p>FY 2016 Plans:</p> <p>In order to accomplish a balanced program, the target ratios of studies, experiments and prototypes, and testing and integration is planned to be roughly 30/40/30 percent. Accordingly, the following activities are planned for FY 2016:</p> <p>Ongoing study efforts: (base level of analytic effort)</p> <ul style="list-style-type: none"> - 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), and undersea engagements. <p>Studies:</p> <ul style="list-style-type: none"> - Development of analytic tools and analysis for electronic warfare and air superiority in a complex environment. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603288D8Z / <i>Science and Technology (S&T) Analytic Assessments</i>	Project (Number/Name) P328 / <i>Science and Technology Analytic Assessments</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Experimental data collection applied to a wider range of ISR capabilities. - System and technology assessments for surface and sub-surface warfare. <p>Prototyping and Experimentation:</p> <ul style="list-style-type: none"> - Continue prototype development of an electronic attack capability for a high priority ballistic missile threat. - Continue prototype development of an electronic attack for a high priority surface naval engagement. - Continue prototype development of a next generation electronic warfare capability for for both air and surface based kill chains. - Development of capability improvement prototype concept for resilient ISR. - Architecture assessment and element prototyping for countering situational awareness resources. <p>Testing:</p> <ul style="list-style-type: none"> - Testing of capability improvement prototype concept for resilient ISR. - Testing of capability improvement architecture prototype for assured tactical communications. - Testing prototype for next generation electronic warfare capability for both air and surface based kill chains. 			
Accomplishments/Planned Programs Subtotals	-	12.000	14.645

C. Other Program Funding Summary (\$ in Millions)

N/A

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.
- Experiments and prototypes demonstrate new technologies or enable new tactics, techniques and procedures for dealing with emerging threats.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>					PE 0603289D8Z I <i>Advanced Innovative Analysis and Concepts</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	-	50.000	59.830	-	59.830	57.654	57.649	57.642	58.422	Continuing	Continuing
P329: <i>Advanced Innovative Analysis and Concepts</i>	0.000	-	50.000	59.830	-	59.830	57.654	57.649	57.642	58.422	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	-	60.000	60.000	-	60.000
Current President's Budget	-	50.000	59.830	-	59.830
Total Adjustments	-	-10.000	-0.170	-	-0.170
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Economic Assumptions	-	-	-0.170	-	-0.170

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603289D8Z / <i>Advanced Innovative Analysis and Concepts</i>				Project (Number/Name) P329 / <i>Advanced Innovative Analysis and Concepts</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P329: <i>Advanced Innovative Analysis and Concepts</i>	-	-	50.000	59.830	-	59.830	57.654	57.649	57.642	58.422	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 2014	FY 2015	FY 2016
Title: Low-Cost Payloads	-	12.600	-
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 will transition to the Advanced Innovative Technologies Program Element (PE) 0604250D8Z in FY 2016 as part of the Unmanned Aerial Vehicle Payloads project.			
FY 2015 Plans:			
<ul style="list-style-type: none"> • Design and conduct proof-of-concept and end-to-end demonstrations of four prototype systems. • Demonstrate prototypes within Exercise Northern Edge 2015. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603289D8Z / <i>Advanced Innovative Analysis and Concepts</i>	Project (Number/Name) P329 / <i>Advanced Innovative Analysis and Concepts</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Perform technical, operational, and red team analysis to determine capabilities' potential to counter strategic adversaries and improve the U.S. security posture in peacetime, crisis, and conflict. • Prototype and test in partnership with Service and Agency program offices to speed transition to a program of record or limited operational use. 				
<p>Title: Command and Control of the Information Environment</p> <p>Description: The Command and Control of the Information Environment project leverages commercial and other existing software tools to enable dynamic engagement of foreign targets in the information environment, informed by a shared understanding of centrally controlled strategic narratives. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Complete collaboration lab infrastructure install. • Develop coordination framework and complete associated workflow requirements analysis. • Establish a developmental environment for evaluation of commercial software tools. • Begin assessment of analytic services and applications. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Refine existing software tools within a collaboration environment. • Conduct operational demonstration for Combatant Commander (CCMDs). • Establish a Department-wide architecture for fusing and managing Operations Security and Acquisition Enhanced Program Protection Plans (EP3) into a single threat oriented Common Operating Picture (COP). 		-	7.800	10.000
<p>Title: High-Fidelity Analysis and Concept Generation</p> <p>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.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Work with the Services Program Offices and CCMDs to identify novel uses of existing systems and technologies while exploring new and different concepts of operation. 		-	29.600	49.830

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603289D8Z / <i>Advanced Innovative Analysis and Concepts</i>	Project (Number/Name) P329 / <i>Advanced Innovative Analysis and Concepts</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Conduct Technical and Operational exchange meetings with CCMDs to ensure appropriate emphasis on value added benefit of recommended alternatives. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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	-	50.000	59.830

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603527D8Z / <i>Retract Larch</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	39.320	-	-	118.666	-	118.666	184.000	172.666	163.666	163.000	Continuing	Continuing
P527: <i>Retract Larch</i>	39.320	-	-	118.666	-	118.666	184.000	172.666	163.666	163.000	Continuing	Continuing

Note

NOTE: In FY2016, a new program is being funding in this Program Element. The program contains parts of existing Science and Technology work but is a New Start due to the expansion and increased funding of these efforts.

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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	118.666	-	118.666
Total Adjustments	-	-	118.666	-	118.666
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• New Start program efforts - Classified	-	-	118.666	-	118.666

Change Summary Explanation

NOTE: In FY2016, a new program is being funding in this Program Element. The program contains parts of existing Science and Technology work but is a New Start due to the expansion and increased funding of these efforts.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
0400 / 3					PE 0603527D8Z / <i>Retract Larch</i>				P527 / <i>Retract Larch</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P527: <i>Retract Larch</i>	39.320	-	-	118.666	-	118.666	184.000	172.666	163.666	163.000	Continuing	Continuing

Note
 NOTE: In FY2016, a new program is being funding in this Program Element. The program contains parts of existing Science and Technology work but is a New Start due to the expansion and increased funding of these efforts.

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 2014	FY 2015	FY 2016
Title: Retarct Larch	-	-	118.666
Description: Not applicable. Information Classified			
FY 2014 Accomplishments: Not applicable. Information Classified			
FY 2016 Plans: Not applicable. Information is Classified.			
Accomplishments/Planned Programs Subtotals	-	-	118.666

C. Other Program Funding Summary (\$ in Millions)
 N/A

Remarks

D. Acquisition Strategy
 Not Applicable. Classified

E. Performance Metrics
 Not Applicable. Classified

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603618D8Z I <i>Joint Electronic Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	8.772	10.949	43.966	-	43.966	23.446	14.599	13.186	12.360	Continuing	Continuing
P619: <i>Joint Electronic Advanced Technology</i>	-	8.772	10.949	17.466	-	17.466	11.609	11.721	12.300	12.360	Continuing	Continuing
P244: <i>Advanced EW Technology Maturation Project</i>	-	-	-	13.500	-	13.500	-	-	-	-	Continuing	Continuing
P245: <i>EW Enterprise Exploration and Innovation</i>	-	-	-	13.000	-	13.000	11.837	2.878	0.886	-	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 and systems that are enabled by the significant advances in globally-available commercial electronic components and devices. These threats range from improvised devices being employed by terrorists that are constructed from commercially available electronic and industrial components to dedicated military systems that could be used in ways that diminish our technological advantage in conflicts with nation-states. The rate at which these threats are appearing is accelerating and new threats are appearing quicker than traditional Department of Defense (DoD) requirements and acquisition processes can respond.

The use of asymmetric devices is well understood by both nation-states and terrorists. Using man portable air defense systems, mortars, and improvised explosive devices employing commercial electronic components, terrorists have attacked both air and ground forces, posing threats in any region due to their easy transportability. Unmanned aircraft systems employing advanced commercial electronic components are proliferating and pose threats as both military capabilities and as potential weapons delivery mechanisms.

The extreme 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), Information Operations and EW/Cyber Convergence capabilities that can neutralize threats in fiscally and temporally responsive ways. We must concurrently develop innovative technologies and approaches that will 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's overarching philosophy focuses on innovation to accelerate the pace of EW capabilities development. This program element investigates means to rapidly mitigate new threats by integrating advanced commercial and military off-the-shelf technologies in innovative ways and rapidly demonstrate innovative technological capabilities that can be inserted into the Services' Programs of Record with reduced risk. JEAT efforts are based on three pillars: 1) Experimentation/ Demonstration, 2) Advanced Technology Development/Verification, and 3) Innovative Technology Exploration.

In FY 2016, two efforts were added by the Department to accelerate the fielding of vitally needed EW warfighting capabilities: the Advanced EW Technology Maturation Project and the EW Enterprise Exploration and Innovation Project.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603618D8Z I <i>Joint Electronic Advanced Technology</i>
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The Advanced EW Technology Maturation Project is a one-year effort to demonstrate modular, distributed, configurable EW technologies and systems designs that address requirements identified by the United States Marine Corps (USMC) and U.S. Army. Additionally, technologies demonstrated in this effort will be transitioned to the USMC to enable an earlier transition of vital warfighting capabilities within the Intrepid Tiger II (IT2) FY 2017 Program of Record. This effort will specifically mature counter-radar building blocks to provide new, vitally-needed EW capabilities for U.S. Army and USMC air and ground assets while mitigating blue-on-blue and co-site interference impacts.

The EW Enterprise Exploration and Innovation Project is a four-year effort to (1) accelerate the development of innovative countermeasures to new classes of advanced threats that are being developed and fielded by potential adversaries and (2) provide innovative capabilities to counter anti-access/area denial threats posed by countries possessing modern, advanced integrated air defense systems. Work area in (1) will enable direct technology transitions to the U.S. Air Force and U.S. Navy in ongoing Programs of Record. Research in area (2) will enable earlier fielding, and will explore a variety of non-kinetic technologies, tools and techniques to include converged EW/Cyber approaches and battle management optimization and visualization technologies. Five work units are included in this project: Advanced Airborne Countermeasures Development, Advanced Defensive Countermeasures Development, 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	8.996	10.965	11.969	-	11.969
Current President's Budget	8.772	10.949	43.966	-	43.966
Total Adjustments	-0.224	-0.016	31.997	-	31.997
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.004	-			
• SBIR/STTR Transfer	-0.220	-			
• FFRDC Sec 8104	-	-0.016	-	-	-
• Realignment for Higher Priority Programs	-	-	5.596	-	5.596
• Electronic Warfare Enterprise	-	-	13.000	-	13.000
• Advanced EW Technology Maturation Project	-	-	13.500	-	13.500
• Economic Assumptions	-	-	-0.099	-	-0.099

Change Summary Explanation

FY 2016 realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	Project (Number/Name) P619 / <i>Joint Electronic Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P619: <i>Joint Electronic Advanced Technology</i>	-	8.772	10.949	17.466	-	17.466	11.609	11.721	12.300	12.360	Continuing	Continuing

A. Mission Description and Budget Item Justification

Asymmetric electronic threats enabled by significant advances in globally-available commercial electronic components and devices are proliferating at an alarming rate. This project investigates means to rapidly mitigate new threats by integrating advanced commercial and military off-the-shelf technologies in innovative ways and rapidly demonstrate innovative technological capabilities that can be inserted into the Services' Programs of Record with reduced risk. Efforts concurrently develop innovative technologies and approaches that will give us asymmetric advantages over potential adversaries.

Three efforts currently comprise this project: Experimentation/Demonstration, Advanced Technology Development/Verification, and Innovative Technology Exploration. In FY 2015, we are adding a new effort, EW Enterprise Collaboration and Planning, that addresses selection, organization, oversight, and coordination of new and emerging Electromagnetic Spectrum (EMS) warfare concepts and related efforts within the EW and Countermeasures Office (EW&C) in the Office of the Assistant Secretary of Defense for Research and Engineering (OASD(R&E)). In FY 2016, this area will be expanded to provide analysis and national and international coordination on emerging Information Operations and Electronic Warfare (EW)/Cyber Convergence topics.

Experimentation/Demonstration (First effort: Vigilant Hammer (VH)):

Experimentation/Demonstration efforts focus on experimenting with and demonstrating technologies and approaches to address compelling issues facing the warfighter. Our first Experimentation/Demonstration effort, VH, is a recurring multi-year, multi-agency, live, virtual, and constructive field experimentation venue of increasing complexity focused on advancing the state of the art for the detection, classification, geolocation and prosecution of electromagnetic signals of interest using both Department of Defense (DoD) and national resources. VH is modeled after Joint Electronic Advanced Technology's (JEAT) highly successful BLACK DART, Trident Spectre, and Rotorcraft Aircraft Survivability Equipment Experiment (RASE) venues, and will include both scripted and free play scenarios intended to give participants an opportunity to explore the efficacy of existing and new technological capabilities and approaches to engage emerging EMS threats. Engagement payloads will be developed and vetted in the Distributed Electronic Effects Development (DEED) laboratory discussed below. Additional venues that address pressing warfighter concerns like advanced electro-optical threats and millimeter wave threats will be added in future years.

Advanced Technology Development/Verification (ATD/V) (Ongoing effort: DEED):

ATD/V focuses on research to mature and assess emerging technologies to address compelling EW and converged EW/Cyber warfighter needs. Our ongoing ATD/V effort, DEED, is a laboratory and developmental venue that matures and assesses emerging EW and converged EW/Cyber technologies to enable, e.g., more effective coordination of sensor and electronic attack capabilities to deliver multi-point, collaborative EW and cyber capabilities to warfighters. DEED specifically seeks to identify and pair synergistic technologies to develop systems with capabilities that are greater than the sum of the individual parts.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	Project (Number/Name) P619 / <i>Joint Electronic Advanced Technology</i>
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Innovative Technology Exploration (Ongoing effort: Adaptive/Asymmetric Technology (A/AT)):

Innovative Technology Exploration encompasses a wide variety of efforts focusing on analyses and studies of emerging asymmetric threats for the Director, EW&C. Past work includes the Aircraft Survivability Equipment Joint Analysis Team, the Helicopter Survivability Task Force, and advanced analytic studies of the link budget associated with addressing highly advanced, agile threats. Our ongoing effort in this area, A/AT, produces studies that are strongly supported by the Services and Office of the Secretary of Defense (OSD), and past studies have resulted in significant technology investments by DoD.

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

EW C&P supports the activities of the Director, EW&C related to the selection, organization, oversight, and coordination of new and emerging EMS warfare concepts and related efforts. It includes efforts related to the identification, assessment, formulation of recommendations to address EW-related threat trends impacting sensor, seeker, communications and battle management technologies and countermeasures for these threats; programmatic and budget review and recommendations; and decision support to the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD(AT&L)) on selected programs of record including Critical Program Information standards, Foreign Disclosure advice, and Technical Signals Requirements. This effort further solicits and provides advisory information between OSD and the Joint Staff, Combatant Commands, Service sponsors and Research Engineers including oversight of an extensive variety of EW-related Research and Development (R&D) activities within the department and world-wide. EW C&P efforts support all three JEAT pillars.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Experimentation/Demonstration Vigilant Hammer (VH)</p> <p>Description: The VH series of multi-year, multi-agency, live, virtual and constructive field experimentation venues will host projects that seek to more effectively sense, classify, geolocate, prosecute and assess attack effects against modern, agile and cognitive signals in a dense and highly complex signals environment. VH leverages JEAT's history of conducting highly successful and cost effective experiments to gage the collective ability of DoD and the Intelligence Community to provide a robust, adaptive and effective network of sensing and electronic attack effects using a collaborative, distributed set of electronic systems. A second JEAT demonstration series focusing on another high priority issue area will begin detailed planning in FY 2016.</p> <p>FY 2014 Accomplishments: VH Planning and Design – Efforts focused on VH event design and planning efforts to enable VH 1 to be conducted in March of 2015. VH 1 included both scripted and free play scenarios to give participants opportunities to identify synergies and incrementally build capabilities to engage modern signals threats in a dense and highly complex EMS threats environment.</p> <p>FY 2015 Plans: VH 1 will be conducted in March of FY 2015 with a final report to be produced within a couple of months after the event. Assessment of VH 1 results will guide planning efforts for VH 2, which will begin in 4Q FY 2015.</p> <p>FY 2016 Plans:</p>	2.376	4.139	8.400

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	Project (Number/Name) P619 / <i>Joint Electronic Advanced Technology</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>VH 2 will build on the signals detection, classification, geolocation and prosecution emphasis of VH 1 to add significantly more active attack methodologies to the event. All means of spectrum sensing and attack will be included, which will draw in a much larger community than VH 1. The community will also be first challenged with the experiment objective of gaging our national ability to remotely assess the effects of spectrum attack on adversary systems in near real time.</p> <p>Title: Advanced Technology Development/Verification (ATD/V)</p> <p>Description: ATD/V efforts research to mature and assess emerging technologies to address compelling EW and converged EW/Cyber warfighter needs. Our current ATD/V effort, Distributed Electronic Effects Development (DEED) is a laboratory and developmental venue that will mature and assess emerging EW and converged EW/Cyber technologies to enable, e.g., more effective coordination of sensor and electronic attack capabilities to deliver multi-point, collaborative EW and cyber capabilities to warfighters. DEED specifically seeks to identify and integrate advanced technology devices in a way that creates effects that are greater than the sum of the effects that would be created by the constituent parts. It also seeks to identify innovative ways to accomplish military objectives by using the spectrum in a cost effective way in which we spend less than our adversaries so that we win the cost exchange equation.</p> <p>FY 2014 Accomplishments: FY 2014 efforts focused on establishing the DEED laboratory at appropriate classification levels to evaluate techniques for collaborative EW technique development with an emphasis on the use of Unmanned Aerial Vehicle (UAV) applications. Initial arrangements to bring the first distributed EW effects payloads into the DEED laboratory were made.</p> <p>FY 2015 Plans: FY 2015 efforts will begin identifying and assessing new and innovative EW technologies. Emphasis will be placed on the creation of techniques and approaches that include distributed systems (primarily UAV based). These technologies will be created by combining two or more existing components to produce a new and unique capability that provide more warfighting value than the sum of its parts. Laboratory evaluation of these capabilities in the DEED laboratory will seek to integrate and quantify the benefits of the new approaches, and seek to ultimately prepare products for evaluation in venues like VH. Access will be maintained to a small fleet of UAVs for the purpose of experimentation with distributed EW payloads when they prove to be mature enough for open air experimentation through work-ups in the DEED laboratory.</p> <p>FY 2016 Plans: FY 2016 efforts build on the FY 2015 efforts using DEED and other available laboratories to pursue opportunities with a theme of using the power of distributed networks of devices to deliver spectrum effects. A regular outreach to government and industry will be maintained in FY 2016, and promising technologies will be evaluated and possibly paired together for the purpose of creating new capability that is more than the sum of the individual technological parts.</p>		5.000	1.557	3.253
Title: Innovative Technology Exploration (ITE)		1.396	1.507	1.950

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015	
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015
<p>Description: Our ongoing ITE effort, A/AT, directly supports Assistant Secretary of Defense for Research and Engineering (ASD(R&E)), Director, EW&C through analyses and studies of emerging asymmetric threats. Past efforts under this JEAT project include the Aircraft Survivability Equipment Joint Analysis Team and the Helicopter Survivability Task Force, both of which resulted in significant strategic technology investments by the Department.</p> <p>FY 2014 Accomplishments: FY 2014 A/AT efforts included a landmark study of the challenges associated with performing electronic attack on advanced threats that are part of a sophisticated integrated air defense system. This study pointed out the challenges of taking a conventional approach to defeating this type of system, and recommended that specific live evaluations occur to test alternative means of solving this very difficult problem. Extensive coordination with the Naval Air Warfare Center's Warfare Analysis Department enabled the formulation of plans to create modeling and analytics on very advanced electronic attack techniques and the effect that they will have in critical future warfighting engagements.</p> <p>FY 2015 Plans: FY 2015 efforts are focusing on analysis of alternative courses of action related to packaging and deploying advanced EW technology, particularly that which is of interest in related development efforts. 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.</p> <p>FY 2016 Plans: FY 2016 efforts will focus on analysis of alternative courses of action employing advanced, adaptive and cognitive EW technologies emerging in commercial data communications, radar and other advanced spectrum domains previously dominated by DoD. 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.</p>			
Title: EW Enterprise Collaboration and Planning		-	3.746
<p>Description: This effort supports the EW&C Director's management, oversight, and coordination of the plethora of EMS warfare related activities to the ASD(R&E). It includes: oversight of an extensive volume and variety of R&D activities within the department and world-wide; exploration of new and innovative EMS technologies and approaches; coordination of Departmental R&D, programs, protocols, and policy; analyses of requisite technologies and efforts; ensuring intelligence requirements for EMS warfare related efforts are met; management of interfaces with international partners; management of all EMS development and operational interfaces across the DoD; and reporting relevant information both within the Department and to Congress and other external groups as necessary.</p>			3.863

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	Project (Number/Name) P619 / <i>Joint Electronic Advanced Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2015 Plans:</i> FY 2015 efforts are focusing on analysis of alternative courses of action related to packaging and deploying advanced EW technology, particularly that which is of interest in related development efforts. 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.</p> <p>FY 2015 efforts focus on establishing a cross-service, cross-discipline EW/Cyber Convergence plan and an associated experimentation and prototype planning process; live, virtual and constructive experimentation involving advanced EW/Cyber visualization, employment optimization, battle management and engagement algorithms; promulgation and implementation monitoring of selected, approved FY 2014 EW Assessment recommendations evolved from coordinated analysis and requirements definition with the Joint Chiefs of Staff, United States Strategic Command, United States Pacific Command, and the Services; evaluation and reporting of recommended new Science and Technology (S&T) investment strategies in EW components and systems required to adapt to the evolving challenge of modern electromagnetic sensors, weapons and countermeasures; preparing and presenting plans for enhanced range testing of future systems in support of budgeting decisions; and other Departmental oversight efforts related to EMS warfare capabilities. This project will lead the R&E interactions with Australia under the U.S.-Australia-U.S. Ministerial of Defense Acquisition Committee, and support the coordination of EMS-related R&D and developmental programs within the Department at all classification levels.</p> <p><i>FY 2016 Plans:</i> FY 2016 efforts include analysis of alternative courses of action employing advanced, adaptive and cognitive EW technologies emerging in commercial data communications, radar and other advanced spectrum domains previously dominated by DoD, and 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. Plans and exploratory investigations will evolve to evaluate and harvest emerging concepts and technologies from the R&E Reliance Process and the EW S&T Community of Interest Road Map. Initial areas of focus are expected to be multi-platform, multi-aperture synchronization and control technologies and software algorithms and associated autonomous control systems. Included will be investigations into robust command and control mechanisms with high reliability and strong anti-jam configurations. Measurements in data throughput requirements, enhanced fusion and geolocation mechanisms are also planned for evaluation. Monitoring of evolving, ever-changing threats and alternative countermeasure technologies will continue along with recurring annual reassessments of net progress vis-à-vis realized improvements in mission effectiveness. Analysis and national and international coordination will also begin on emerging Information Operations and EW/Cyber Convergence topics.</p>			
Accomplishments/Planned Programs Subtotals	8.772	10.949	17.466

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Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 3	PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	P619 / <i>Joint Electronic Advanced Technology</i>

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>				Project (Number/Name) P244 / <i>Advanced EW Technology Maturation Project</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P244: <i>Advanced EW Technology Maturation Project</i>	-	-	-	13.500	-	13.500	-	-	-	-	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 2014	FY 2015	FY 2016
Title: Advanced EW Technology Maturation Project	-	-	13.500
<p>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.</p> <p>The architectural and battle management research in this effort also will 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.</p> <p>FY 2016 Plans: FY 2016 efforts focus on maturing 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.</p> <p>These objectives will be accomplished via the following:</p> <ul style="list-style-type: none"> • 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 			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>	Project (Number/Name) P244 / <i>Advanced EW Technology Maturation Project</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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	-	-	13.500

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603618D8Z / <i>Joint Electronic Advanced Technology</i>				Project (Number/Name) P245 / <i>EW Enterprise Exploration and Innovation</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P245: <i>EW Enterprise Exploration and Innovation</i>	-	-	-	13.000	-	13.000	11.837	2.878	0.886	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This four-year project 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 and Development, and Ultra Wideband Receiver Development.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Advanced Airborne Countermeasures Development (AACD)</p> <p>Description: AACD develops advanced countermeasures to protect airborne assets against a wide variety of increasingly sophisticated threat systems possessing expanded spectral and temporal coverage and resolution, complex and diverse waveforms and having significant agility. Efforts will specifically address advanced EW, sensor, and seeker threats involving 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.</p> <p>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.</p>	-	-	4.000
<p>Title: Advanced Defensive Countermeasures Development (ADCD)</p> <p>Description: ADCD 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 products within existing and developmental architectures will be guaranteed by close coordination with both warfighters and technology developers.</p> <p>FY 2016 Plans:</p>	-	-	2.000

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
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.				
<p>Title: Non-Kinetic Battle Management and Visualization Technology Development</p> <p>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.</p> <p>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.</p>		-	-	2.105
<p>Title: Advanced EW and EW/Cyber Exploration and Development (AEWCED)</p> <p>Description: AEWCED establishes a recurring multi-year, multi-agency, Live, Virtual, and Constructive (LVC) venue of increasing complexity to advance the state of the art for countering advanced RF, Electro-Optical (EO) and digital emitters and collectors. The event will be modeled after the highly successful BLACK DART, Trident Spectre, and Rotorcraft Aircraft Survivability Equipment Experiment (RASE) venues, and will include both scripted and free play scenarios intended to give participants an opportunity to explore the efficacy of existing and new technological capabilities to engage emerging threats. AEWCED includes the development and vetting of technologies and engagement payloads in a laboratory environment prior to participation in field experimentation events.</p> <p>FY 2016 Plans: FY 2016 will begin development of a new, recurring multi-year, multi-agency, LVC venue of increasing complexity focused on advancing the state of the art for countering advanced RF, EO and digital emitters and collectors. FY 2016 efforts also include the initial development of new converged EW/Cyber tools and techniques for demonstration in AEWCED 1 and/or VH 3.</p>		-	-	2.895
<p>Title: Ultra Wideband Receiver Development (UWBR)</p> <p>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</p>		-	-	2.000

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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 experimentation/demonstration venues.			
<i>FY 2016 Plans:</i> 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.			
Accomplishments/Planned Programs Subtotals	-	-	13.000

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603648D8Z I <i>Joint Capability Technology Demonstration (JCTD)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	330.671	153.770	119.790	141.540	-	141.540	125.003	130.761	131.672	133.555	Continuing	Continuing
P648: <i>Joint Capability Technology Demonstration (JCTD)</i>	330.671	141.170	119.790	141.540	-	141.540	125.003	130.761	131.672	133.555	Continuing	Continuing
P264: <i>Disruptive Demonstrations</i>	0.000	12.600	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

Historically, the Joint Capability Technology Demonstration (JCTD) Program has worked primarily with Combatant Commands (COCOMs) and Services to identify Department of Defense (DoD) priorities and accelerate development and demonstration of technical solutions to meet warfighter needs not being adequately addressed by the Services. However, with the end of current conflicts there has been a strategic shift to enable introduction of new capability more affordably through employment of Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes while addressing the strategic priorities of the Department, and the Chairman’s Risk Assessment in the following areas: Electromagnetic Spectrum Agility; Space Capability Resilience; Autonomous Systems and Multi-Domain Technologies; Countering Weapons of Mass Destruction; and Force Application.

The shift in the JCTD Program will also result in a shift in Program metrics. 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 JCTD projects. JCTDs will reinforce key partnerships across the Department, Services, other government agencies, select allies, and industry that allow for expedited development, deployment, and evaluation of capability solutions with potential to address some of the most pressing needs of the Department. These JCTD partnerships will enable interdepartmental cooperation and capability development with the Departments of Homeland Security, State, Transportation, Justice, and the National Aeronautics and Space Administration.

In FY 2015, Disruptive Demonstrations funding (P264) was transferred from the JCTD Program Element (PE) to a new PE 0603289D8Z (Advanced Innovative Analysis & Concepts).

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 mitigate emergent threats, and address affordability and interoperability of Defense systems through Pre-EMD prototyping. In FY 2014, the JCTD Program successfully completed the demonstration and transition of several JCTDs that addressed operational warfighting needs of the Department, providing affordable and sustainable solutions. In addition, the program initiated several key prototyping efforts to address the strategic priorities of the Department.

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.
- Recent examples include:

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603648D8Z <i>I Joint Capability Technology Demonstration (JCTD)</i>
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1. A robust “detect and track” capability of "dark", i.e., non-emitting, maritime targets. This is accomplished through automated data fusion of an existing suite of sensors supporting the Maritime Domain Awareness (MDA) function. This capability was successfully transitioned into the Sealink Advanced Analysis system at Office of Naval Intelligence and is now used by multiple agencies to provide a MDA capability.
2. Counter-electronics High powered-microwave Advanced Missile Project (CHAMP) that demonstrated the capability of a missile with an integrated High Powered Microwave source to degrade, disrupt, or damage electronic systems. The results are informing the acquisition system and will be used to address time sensitive capability shortfalls.
3. Jetpack fifth to fourth supports Combatant Commanders' airborne gateway needs to distribute fifth Generation data to fourth Generation fighters by translating 5th Generation tactical data link messages into Link-16 messages that can be viewed by fourth Generation aircraft. It is a critical force multiplier enabling 4th Generation aircraft to participate in a collaborative targeting environment that will be transitioning to our forces.
 - The JCTD Program enables coalition cooperative development by leveraging partner nation expertise and resources; approximately one-fifth of JCTD projects involve some degree of coalition partner participation. 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 24 - 48 months.
- The JCTD program achieved transition rates of the following: 70 percent transitioned to a new or existing Program(s) of Record, 24 percent transitioned to fieldable-prototypes (residual capabilities) sustained by non-JCTD funds in direct support of operations in theater. In FY 2014, 17 of 18 completed JCTDs successfully transitioned.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	165.008	131.960	146.878	-	146.878
Current President's Budget	153.770	119.790	141.540	-	141.540
Total Adjustments	-11.238	-12.170	-5.338	-	-5.338
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-12.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-6.728	-			
• SBIR/STTR Transfer	-4.510	-			
• Realignment for Higher Priority Programs	-	-	-4.957	-	-4.957
• FFRDC Adjustments	-	-0.170	-	-	-
• Economic Assumptions	-	-	-0.381	-	-0.381

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense Date: February 2015

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)*

Change Summary Explanation

The increase in funding from FY 2015 to FY 2016 was added for Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes to support Combatant Commanders' needs. The baseline adjustment of -\$5.338 million reflects adjustments for Economic Assumptions and realignment for higher priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>				Project (Number/Name) P648 / <i>Joint Capability Technology Demonstration (JCTD)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P648: <i>Joint Capability Technology Demonstration (JCTD)</i>	330.671	141.170	119.790	141.540	-	141.540	125.003	130.761	131.672	133.555	Continuing	Continuing

Note

Historically, the Joint Capability Technology Demonstration (JCTD) Program has worked primarily with Combatant Commands (COCOMs) and Services to identify Department of Defense (DoD) priorities and accelerate development and demonstration of technical solutions to meet warfighter needs not being adequately addressed by the Services. However, with the end of current conflicts there has been a strategic shift to enable introduction of new capability more affordably through employment of Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes while addressing the strategic priorities of the Department, and the Chairman’s Risk Assessment in the following areas: Electromagnetic Spectrum Agility; Space Capability Resilience; Autonomous Systems and Multi-Domain Technologies; Countering Weapons of Mass Destruction; and Force Application.

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P648 / <i>Joint Capability Technology Demonstration (JCTD)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: National Technical Nuclear Forensics (NTNF)</p> <p>Description: NTNF will strengthen strategic nuclear deterrence by enhancing nuclear forensics capabilities supporting attribution after release of nuclear materials (details are classified). NTNF will integrate advanced air and ground debris sample collection technologies in both manned and unmanned platforms, and integrate DoD capabilities into the developing joint interagency Concept of Operations for advanced air and ground sample collection with global applicability. The project will also demonstrate enhanced integrated yield estimation methods for nuclear events. Techniques to be employed will increase capabilities to determine initial yields and collect nuclear debris, while enhancing safety for NTNF Task Force personnel.</p> <p>FY 2014 Accomplishments: Completed and produced operational assessments for two key NTNF components; Airborne Radiological Detection and Identification Measurement Systems (ARDIMS)/Mobile Mission and HARVESTER Particulate Airborne Collection System (PACS). The ARDIMS/Mobile Mission and video reconnaissance equipment was integrated on a UH-60 helicopter and then conducted airborne radiological surveys and video/visual reconnaissance missions replicating fallout for an area exposed to a low-yield</p>	1.840	-	-

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P648 / <i>Joint Capability Technology Demonstration (JCTD)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
improvised device. Completed a successful operational military evaluation for integration and utilization of the Harvest PACS particulate sampling pod integrated on the Special Airborne Mission Installation and Response (SABIR) stores arm with a C-130H aircraft. Technology elements of the NTN JCTD include: 1) Integrated Yield Determination Tool (IYDT) Software, 2) ARDIMS/ Mobile Mission, 3) AGSCP ground collection missions, and 4) the HARVESTER PACS transitioned to their respective Services. Completed the JCTD.				
<p>Title: Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS)</p> <p>Description: SPIDERS is demonstrating cyber-secure “smart” micro-grids with demand side management and integration of renewable energy and storage on military installations, in partnership with Department of Homeland Security (DHS) and Department of Energy (DOE). The expected output and efficiency to be demonstrated is a reduction in the “unacceptably high risk” of extended electric grid outages by developing the capability to “island” installations while maintaining operational surety and security.</p> <p>FY 2014 Accomplishments: Completed second operational demonstration at Fort Carson, Colorado. Transitioned micro-grid to Fort Carson tenants. Conducted second SPIDERS industry day and shared results with stakeholders. Completed micro-grid design for third phase evaluation at Camp Smith, Hawaii.</p> <p>FY 2015 Plans: Perform third and final technical and operational demonstration on the entire installation at Camp Smith, Hawaii to include an economic opportunity to reduce electrical costs at the base. Transition micro-grid to Camp Smith stakeholders. Complete the JCTD.</p>		0.529	0.708	-
<p>Title: Arctic Collaborative Environment (ACE)</p> <p>Description: ACE will transition an open-access, web-based, Arctic regional and national decision-support system that integrates geo-referenced data from existing remote sensing assets to provide a monitoring, analysis, and visualization decision-support system based on earth observation data and modeling analysis. The primary outputs and efficiencies are: (1) increased Arctic maritime domain awareness to protect maritime commerce, critical infrastructure, and key resources; (2) obtain, analyze, and disseminate accurate data from the entire Arctic region, including both paleo-climatic data and observational data to enable accurate prediction of future environmental conditions and climate; and (3) serve as the foundation for an effective Arctic circumpolar observing network with broad partnership from other relevant nation.</p> <p>FY 2014 Accomplishments:</p>		1.145	-	-

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P648 / <i>Joint Capability Technology Demonstration (JCTD)</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Integrated the capability with existing Joint Operations Centers to include: U.S. Pacific Command, U.S. Northern Command (in particular Alaska Command (ALCOM)), Joint Task Force Alaska (JTF-AK), U.S. Coast Guard District 17, and the Federal Emergency Management Agency. Completed the JCTD.				
Title: Three Dimensional Landing Zone (3D-LZ)		2.622	-	-
Description: 3D-LZ will deliver an integrated sensor suite capable of providing rotorcraft pilots with situational awareness during degraded visual environments encountered on takeoff and landings, cable warning and obstacle avoidance cues, and general terrain awareness for safety of flight. The program will deliver an integrated turret to the Global Reach Program Office.				
FY 2014 Accomplishments: Completed Operational Utility Assessment. Transitioned to Air Force Global Reach Program Office. Completed the JCTD.				
Title: Anti-Jam Precision Guided Munitions (AJPGM)		7.900	5.900	-
Description: AJPGM will enable precision navigation capability in severely degraded Global Positioning System (GPS) environments. AJPGM will also deliver home-on-jam capability. Specifics related to technologies, current capability, and threats are classified.				
FY 2014 Accomplishments: Integrated sensor assemblies. Conducted technical demonstrations on surrogate unmanned vehicles. Formed factor sensor assemblies to allow integration with inventory weapon platforms.				
FY 2015 Plans: Integrate sensor assemblies with weapon platforms. Conduct flight test technical demonstrations using inert weapons. Conduct flight test operational demonstrations using live weapons. Conduct final utility assessment. Complete JCTD.				
Title: Autonomous Mobility Appliqué System (AMAS)		2.128	-	-
Description: AMAS will equip existing military ground vehicles with scalable modes of robotic technology through the integration of modular kits, common interfaces, and a common architecture. AMAS will be comprised of a fly-by-wire kit that will provide active safety functionality and a standard control approach to allow for current and future robotics to be implemented relatively seamlessly onto military tactical vehicles, and an Autonomy kit that will contain the primary sensing and intelligence for scalable modes of Autonomy and leader/follower behaviors for convoy operations.				
FY 2014 Accomplishments: Completed final development of the Autonomy system. Conducted second Technical Demonstration and final Operational Demonstration with Military Utility Assessment. Residuals transitioned to Army and Marine Corps users. AMAS JCTD				

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
technologies spiraled into existing Army Husky Mounted Detection System Program of Record and Route Clearance and Integration System Program of Record. AMAS also transitioned to a new Army Semi-Autonomous Convoy Operations (SACO) Program of Record. Completed the JCTD.				
<p>Title: CELESTIAL REACH</p> <p>Description: CELESTIAL REACH addresses the limitations placed on high-priority and senior leader communications existing as a result of current Communications Satellite (COMSAT) capability and data throughput. Presently limited to a maximum data rate of 256 kilo bites per second (kbps) to/from the aircraft, capacity to maintain global communications is further impacted by peak-period COMSAT user saturation. This JCTD provides U.S. Special Operations Command the capability and capacity to communicate effectively using a robust C-17 portable Hatch Mounted Satellite Antenna (HMSA) during crisis in response to the Chairman, Joint Chiefs of Staff Concept of Operations Plan, and other contingency requirements.</p> <p>FY 2014 Accomplishments: Completed the antenna-to-hatch integration; electromagnetic interference; and vibro-acoustic testing. Conducted the in-flight Operational Demonstration and Joint Utility Assessment; and delivered the HMSA prototypes to U.S. Special Operations Command. Completed the JCTD.</p>		1.996	-	-
<p>Title: Deep Seaweb (DSW)</p> <p>Description: DSW provides a capability to persistently detect and monitor high traffic maritime areas of interest to find/fix/track illicit traffickers in source and transit zones. DSW will deliver an undersea-network of fixed bottom sensor nodes, mobile unmanned communication gateways, and an operations center server that will provide autonomous 24/7 tripwire surveillance to cue coalition forces of trafficking threats including fully submersible vessels. This information will be available to the tactical decision makers for near real-time action by U.S. or partner nation detection and monitoring assets.</p> <p>FY 2014 Accomplishments: Conducted the technical demonstration in operationally representative environment and evaluated integration with operations center workflow. Conducted the operational demonstration.</p>		3.220	-	-
<p>Title: Defense Installation Access Control (DIAC)</p> <p>Description: DIAC will develop an identity management enterprise service's architecture that will provide timely, accurate, and actionable information to support installation access control decision-making process based on authoritative data sources such as the National Crime Information Center and Terrorist Screening Database in order to initially and continuously vet all personnel prior to entry to DoD installations worldwide.</p> <p>FY 2014 Accomplishments:</p>		2.184	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Conducted two operational demonstrations of the architecture, including sharing access control information between the Services and vetting individuals against a subset of the Federal Bureau of Investigation's National Crime Information Center Wanted Persons file. Completed independent assessor report. U.S. Northern Command sponsor issued final positive operational utility determination. Transitioned DIAC capabilities to the Defense Manpower Data Center. Completed the JCTD.				
<p>Title: Foliage Penetrating Airborne Light Detection and Ranging (LIDAR) for Reconnaissance Imaging (FALCON-I)</p> <p>Description: FALCON-I will provide a unified foliage penetrating (FOPEN) sensing system that collects, processes, and fuses LIDAR and Ultra High Frequency (UHF) Synthetic Aperture Radar (SAR) to produce a comprehensive three dimensional (3D) view of human activity, terrain, and lines of communication obscured by foliage. The ultimate goal of the FALCON-I is to provide analysts and Warfighters a simple to understand 3D image of foliage obscured target areas of interest.</p> <p>FY 2014 Accomplishments: Completed Technical and Operational Demonstrations and a Joint Military Utility Assessment. Transitioned the FALCON-I platform, tools, and algorithms needed for fusing/layering LIDAR and SAR data to U.S. Southern Command. Completed the JCTD.</p>		2.893	-	-
<p>Title: Kestrel Eye</p> <p>Description: Kestrel Eye is 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. The cost of less than \$1.500 million enables an affordable constellation for persistence, near continuous converge between 45 degrees North/South. The primary outputs and efficiencies are: (1) finish one Block one "proof of concept" design; launch Block one Kestrel Eye and conduct on-orbit evaluation; and upgrade Block two design with propulsion system and improved telescope pointing using a star tracker. The JCTD will build and launch three Block two design Kestrel Eye satellites.</p> <p>FY 2014 Accomplishments: Continued construction of two Block 2 design Kestrel Eye satellites. FY 2014 resources will continue to produce results in FY 2015 and include launch, operational demonstrations, and assessments. Launch tentatively scheduled for October 2015.</p>		2.718	-	-
<p>Title: Kinetic/Non-kinetic Integrated Force Effects (KNIFE)</p> <p>Description: 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 provides an integrated, enterprise capability that models multiple effects for planner targeting collaboration and Commander's decision. The</p>		2.266	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
integrated targeting capabilities include: cyber, electronic warfare, kinetic and space effects. KNIFE provides more robust, accurate and timely targeting management during planning and execution.				
FY 2014 Accomplishments: Published sequenced tasks for in-line approval by senior decision makers. Addressed Diplomatic, Informational, Military and Economic effects analysis and incorporated targeting consideration into KNIFE. Completed the JCTD.				
Title: Rapid Open Geospatial User Environment (ROGUE)		2.087	-	-
Description: ROGUE will deliver operational open geospatial analytic and Volunteered Geospatial Information (VGI) services; Concept of Operations; Tactics, Techniques, and Procedures (TTPs); and work flows/processes. ROGUE will provide Web-based geospatial capability linking Joint Task Force Headquarters components to the tactical edge of mixed U.S., partner nation, interagency components, and private sector non-government Organizations. ROGUE will facilitate accessibility from multiple user platforms (Web-portal, Desktops, Smart Phones, etc.) to enable partnering with agencies and countries conducting Humanitarian Assistance/Disaster Relief support missions in support of Theater Security Cooperation and Humanitarian Assistance.				
FY 2014 Accomplishments: Completed successful Technical and Operational Demonstrations, and a successful Operational Utility Assessment. Completed the JCTD.				
Title: Soldier-Warfighter Operationally Responsive Deployer for Space (SWORDS)		3.897	-	-
Description: SWORDS provides a dedicated, low cost, rapid, and predictable launch of small satellites to precise, optimum orbits. It provides the capability to satisfy Combatant Command's urgent needs for augmentation of persistent imagery or communications in their area of responsibility. When in production, SWORDS is targeted to cost \$1.000 million per launch of 25 kilogram payloads up to a 750 kilometers circular orbit from a wide variety of ranges, including austere locations.				
FY 2014 Accomplishments: Constructed and test fired first stage engine in ground test stand. Developed Phase two plans.				
Title: Unified Command and Control (UC2)		3.306	-	-
Description: The UC2 JCTD provides the capability to support discretionary information sharing on a common network with compartmented network protection. 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 (A2/AD) environments and allows greater access to assured C2 for Component Commanders, Joint Task Forces, and functional component headquarters.				

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i> Installed and tested the Common Mission Network Transport (CMNT) and Agile Virtual Enclave (AVE) at three additional sites in U.S. Pacific Command. Conducted a successful Operational Demonstration and Joint Utility Assessment. Transitioned the CMNT to Defense Information Systems Agency and the AVE to U.S. Navy Space and Naval Warfare Systems Command (SPAWAR) for sustainment. Completed the JCTD.</p>				
<p><i>Title:</i> Vector</p> <p><i>Description:</i> Vector will demonstrate two cube satellites for an on-orbit Technical Demonstration (TD), Operational Demonstration (OD) and Operational Utility Assessment (OUA). The system will continue to be used for operations until reaching their respective end-of-life. Additional details are classified.</p> <p><i>FY 2014 Accomplishments:</i> Launched two cube satellites, completed on-orbit checkout and conducted a successful TD, OD, and OUA. Completed the Final Report and transitioned residuals to U.S. Special Operations Command and Navy Program Executive Office-Space Systems. Completed the JCTD.</p>		1.059	-	-
<p><i>Title:</i> Advanced Weapons Enhanced by Submarine Unmanned Aerial System against Mobile targets (AWESUM)</p> <p><i>Description:</i> 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 A2/AD 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.</p> <p><i>FY 2014 Accomplishments:</i> Continued shipboard integration activities, increased UAS endurance and communications, and successfully conducted an at-sea Technical Demonstration of the capability. FY 2014 resources will continue to produce results in FY 2015 and include shipboard integration activities and improvements to UAS endurance and communications, an Operational Demonstration during an at-sea U.S. Pacific Command Exercise (Talisman Saber 15), and transition of AWESUM capabilities into a Program of Record to complete the JCTD.</p>		4.738	-	-
<p><i>Title:</i> Body Wearable Antenna (BWA)</p> <p><i>Description:</i> BWA demonstrates a meta-material based antenna design to replace multiple conventional whip antennas worn by all Service radio operators. BWA offers greater performance and concealment than whip antennas, increasing Warfighter</p>		1.610	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>capability and survivability. The prototype antenna is integrated onto a load-bearing belt with mission necessary enhanced features identified and addressed. BWA also predicts greater performance and signal strength at several different positions versus current whip antennas, including the limiting prone position. BWA replaces four current distinct whip antennas, totaling over five pounds, necessary to cover the same communication band. BWA weighs three pounds creating a lighter load and increasing operator maneuverability by dispersing weight around the waist. Radiation patterns for BWA will demonstrate lower radiation levels to the head compared to legacy antennas.</p> <p>FY 2014 Accomplishments: Refined system requirements and program goals. Conducted trade studies and analyses to optimize system design. Held formal requirement and design reviews for manufacturability-optimized materials and production processes. Completed system development. Fabricated prototypes and integrated with communications systems. Conducted internal preliminary verification testing and conducted formal JCTD/operational utility testing in cooperation with sponsoring user agency. Completed the JCTD.</p>				
<p>Title: Coalition Tactical Awareness and Response (CTAR)</p> <p>Description: 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. CTAR's wide area SAR field of view will be used to cue commercial Electro-Optical (EO) imaging satellites for higher resolution collection against vessels of interest.</p> <p>FY 2014 Accomplishments: Conducted two Technical Demonstrations of the end-to-end CTAR architecture by providing vessel detections using commercial SAR satellites and a mobile ground antenna/terminal. Conducted the first demonstration of the CTAR capability in the U.S. Africa Command area of responsibility. The second was conducted at the Department of Homeland Security (DHS) Air-Marine Operations Center.</p> <p>FY 2015 Plans: Conduct an in-theater Operational Demonstration and Operational Utility Assessment incorporating both commercial SAR and EO imaging into the CTAR architecture. Deliver the residual CTAR architecture including the mobile ground antenna/terminal for DoD and DHS use. Complete transition and close-out the JCTD.</p>		3.968	2.943	-
<p>Title: Dense Pack Access Retrieval and Transit (DPART)</p> <p>Description: DPART will demonstrate a suite of remotely controlled battery and hybrid powered material handling equipment (MHE) that can selectively access wheeled/tracked vehicles and containers and omni-directionally move them throughout confined spaces (including ships underway, hangars, and land based facilities).</p>		4.945	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i> Completed the wheeled propulsion integration effort to the Container Lift and Maneuver System (C-LMS) and tested the capability of the system to transport loads up and down internal ship ramps. Conducted preliminary analysis and test of the battery system. Completed final in-house testing of the diesel C-LMS. FY 2014 resources will continue to produce results in FY 2015 and include: Technical Demonstration and Limited Operational Utility Assessment number one of the diesel C-LMS; fabrication of the universal remote control (URC) and the Autonomous Naval Transport, Large Wheeled Vehicle (ANT-LWV) system; a Technical Demonstration and Limited Operational Utility Assessment number two of the ANT-LWV and URC; completion of the final and full Operational Utility Assessment; transition residuals to the appropriate organizations; and transition to a General Service Administration (GSA) Schedule.</p>			
<p><i>Title:</i> Joint Biological Agent Decontamination System (JBADS) <i>Description:</i> JBADS will provide biological decontamination by employing an innovative closed-loop, hot/humid forced air technique to significantly decontaminate the exterior/interior of a fully encapsulated aircraft. The system provides a significant leap forward from the currently approved use of hot, soapy water without the corrosive properties inherent with commonly used biological disinfectants used for rolling stock but not permitted on aircraft. This fully air-transportable green technique is designed for aircraft, however, the building block approach of the Thermal Decontamination Containment System allows for infinite configurations to encapsulate contaminated equipment in the future.</p> <p><i>FY 2014 Accomplishments:</i> Completed and integrated the second Biological Thermal Unit with the Thermal Decontamination Containment System and successfully demonstrated capability to provide the environment needed to decontaminate an aircraft (C-130). Conducted the operational assessment; published Joint/Interagency Concept of Operations, Tactics, Techniques and Procedures, and doctrine change recommendations. FY 2014 resources will continue to produce results in FY 2015 and will analyze, evaluate, and publish scientific test results, maintain a residual operational capability for biological decontamination that is easily adaptable for rolling stock and other aircraft sizes, continue training and collaborate with Department of Homeland Security (DHS) for potential DHS applications and complete the JCTD.</p>	3.646	-	-
<p><i>Title:</i> Joint Operational Long Term Evolution Deployable Tactical Cellular System (JOLTED TACTICS) <i>Description:</i> 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.</p> <p><i>FY 2014 Accomplishments:</i></p>	2.415	1.495	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Conducted a successful Operational Demonstration (OD) utilizing an integrated SBU and Suite-B capability. The National Assessment Group completed a limited assessment of the OD and provided recommendations in support of a FY 2015 follow on OD.</p> <p>FY 2015 Plans: Complete the Suite-B Information Assurance Certification; complete the OD and Operational Utility Assessment; transition residuals to Naval Air Systems Command and U.S. Special Operations Command; deliver the JCTD Final Report; and complete the JCTD.</p>				
<p>Title: Mobility</p> <p>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 sanctuary and expeditionary environments. Mobility will provide ability 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.</p> <p>FY 2014 Accomplishments: Completed the Implementation Directive, Management Plan, and Technical Transition Agreement. Integrated key technologies in unclassified networks. Obtained security approval to operate on unclassified network. Conducted Technical Demonstrations number one and two. FY 2014 resources will continue to produce results during FY 2015 and include: integration of key technologies on classified networks, security approvals for classified networks, Technical Demonstration number three, operational demonstration, user and utility assessment, and determine military utility.</p>		3.910	-	-
<p>Title: Multi Domain Simultaneous Access Virtual Environment (MD-SAVE)</p> <p>Description: MD-SAVE reduces overall networking infrastructure and allows a single workstation to access multiple domains utilizing one wire, while maintaining security separation. This solution will reduce network total cost of ownership. MD-SAVE leverages technology to enable the collapse of multi-tower workstations into one box. This approach is hardware-based and a prototype exists. Current design will allow for the collapse of up to 16 domains, ensuring physical separation and no cross-domain information flow. The result is a reduced multi-domain workspace that is certified and accredited saving space, weight, and power at U.S. Central Command Headquarters.</p> <p>FY 2014 Accomplishments:</p>		3.968	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Conducted a Limited Utility Assessment (LUA) with multiple MD-SAVE Desktop Workstations to test at multiple levels. Completed certification and accreditation (Secret and Below Information and Top Secret and Below Information), and completed an operational demonstration to an enterprise network.				
<p>Title: Signal Intelligence Derived Electromagnetic Spectrum (SDEST)</p> <p>Description: SDEST will leverage National Security Agency (NSA) modernization initiatives to deliver Electro-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.</p> <p>FY 2014 Accomplishments: Defined information flow and data environment. Identified information needs for desired OM/TFs. Developed OM/TF delivery and display capabilities (details are classified). Developed query capability, defined the object model, and identified the appropriate data sources for populating Electronic Warfare (EW) objects. Began investigating cross domain solution for SIPRNet delivery of EW objects. Performed a limited utility assessment. FY 2014 resources will continue to produce FY 2015 results and include incorporation of OM/TFs utilizing Cloud-based data processing and correlation, Smart Data Tagging and PKI access, widget/app-based query/subscription mechanism and thin client display/analysis tools, implement a cross domain solution across SIPRNet, develop radio frequency spectrum view, E-SPACE increment three cloud capability delivery, provide initial delivery of EW objects to the Kinetic/Non-Kinetic Integrated Force Effects (KNIFE) JCTD, conduct a Operational Utility Assessment, transition SDEST capabilities to E-SPACE, and complete the JCTD.</p>		8.114	-	-
<p>Title: Tactical Infrastructure Enterprise Services (TIES)</p> <p>Description: TIES provides capabilities to perform web services in the Denied-Disconnected Intermittent Limited (D-DIL) environment and the capabilities to pass data to the Tactical Edge (TE). TIES enables information sharing by delivering implementations of federated services: Collaboration (chat) and Security Framework (Identity Management). TIES enables D-DIL information exchanges among U.S. Army (USA), U.S. Air Force (USAF), U.S. Navy (USN), U.S. Marine Corps (USMC) systems using compression, prioritization, synchronization, replication, and aggregation. TIES will transition these TE secured capabilities to the Services tactical C2 systems used in the D-DIL environment.</p> <p>FY 2014 Accomplishments:</p>		3.680	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Provided preliminary capabilities for TE implementations for USA, USAF, USN, and USMC C2 systems to exchange data in D-DIL environment. Conducted Operational Demonstration number one. FY 2014 resources will continue to produce results during FY 2015 and include Operational Demonstration number two and a user assessment to complete the JCTD.</p> <p>Title: Low Cost Innovative Projects</p> <p>Description: Provide resources for approved JCTD projects requiring less than \$1.000 million.</p> <p>FY 2014 Accomplishments: Completed Command and Control Gap Filler (C2GF), a project that provides capabilities to share all-source air surveillance data between DoD and other government departments. Completed Computer Active Network Defense in Depth (CANDID), a project that delivers cyber surveillance and situational awareness through fusion of heterogeneous sensor data. Completed Countermeasure Expendable with Replaceable Block Elements for Reactive Unmanned Systems Multi-Mission Jammer (CERBERUS), which delivers a net-enabled modular expendable jamming system based on the Air Force Miniature Air-Launched Decoy (MALD) that employs replaceable nosecone payloads to counter emerging threats in the U.S. Pacific Command area of responsibility. Completed Regional Domain Awareness (RDA), which demonstrates a standards-based unclassified framework for information sharing between U.S. government agencies and international partners. Completed Joint Enterprise Terminal Pack (JETpack) fifth to fourth, a technology that supports the airborne gateway to distribute fifth Generation data to fourth Generation fighters by translating their tactical data link into Link-16 messages that can be viewed by the fourth Generation aircraft. Completed and transitioned Information Volume & Velocity (IV2), a data discovery and processing capability that enables users to identify and visualize patterns, trends and changes in publicly available information over time and space to enhance decision-making. Completed the build and testing of three nano-satellites and associated ground hardware as part of the Space & Missile Defense Command (SMDC) Nano-satellite Program (SNaP-3). Completed "SPICE," a classified program.</p>		4.063	-	-
<p>Title: Combatant Commander (COCOM) Direct Participation, Transition Enabling, and Special Programs</p> <p>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 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 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: A limited number of classified projects such as electronic miniaturization, electronic countermeasures, advanced mobile ad hoc network communications, and space situational awareness,</p>		25.300	25.300	25.650

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>which require enhanced security measures due to need-to-know and/or mission partner sensitivities, are managed within the Program Integration Office.</p> <p>FY 2014 Accomplishments: Continued to provide COCOM direct participation to enable COCOM staff participation in developing and executing JCTD projects, ensuring direct warfighter input and proper focus of JCTD projects. Sustained selected completed JCTD efforts until POR funds are received. Developed and executed projects as proposed by COCOMs.</p> <p>FY 2015 Plans: Continue to provide COCOM direct participation to enable COCOM staff participation in developing and executing JCTD projects, ensuring direct warfighter input and proper focus of JCTD projects. Sustain selected completed JCTD efforts until POR funds are received. Develop and execute projects as proposed by COCOMs.</p> <p>FY 2016 Plans: Continue to provide COCOM direct participation to enable COCOM staff participation in developing and executing JCTD projects, ensuring direct warfighter input and proper focus of JCTD projects. Sustain selected completed JCTD efforts until POR funds are received. Develop and execute projects as proposed by COCOMs.</p>				
<p>Title: Enabling Technologies (ET)</p> <p>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.</p> <p>FY 2014 Accomplishments: Projects included analysis of a capability for aerial delivery of Humanitarian Assistance/Disaster Relief (HA/DR) aid directly local survivors without risk of injury; an Integrated Building Partnership Capacity toolset for systemic planning, implementation, and assessment of DoD Security and HA/DR missions; Unmanned Aircraft System (UAS)-based flexible interdiction and defeat capability to counter Global Positioning System (GPS) and communications jamming threats; coalition port surveillance capability for cueing and tracking of Naval assets; affordable propulsion system to support growing demand for small launch vehicles; adaptive cyber defense systems for unclassified DoD logistics networks; rapidly deployable micro-scale unmanned air sensor platforms for night-time use; affordable early warning and characterization of maritime cruise missile attacks; enhanced access to Ultra High Frequency (UHF) Satellite Communications (SATCOM) for disadvantaged users; a global system for parsing and distribution of distress messages for collaborative exchanges between Personnel Recovery Centers; attack avoidance of tactical cloud systems by continuously restoring servers to an uncontaminated state within minutes; techniques for tracking and inference</p>		6.000	7.000	4.500

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>of targets by extending the sheaf approach to the air domain; and behavior-based advanced tracking algorithm for land and maritime vehicles.</p> <p>FY 2015 Plans: Assessments will be based on maturity of emerging technologies capable of addressing Strategic Portfolio Review, Chairman Gaps, or eroding technological superiority shortfalls. 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, etc.).</p> <p>FY 2016 Plans: Assessments will continue to be based on maturity of emerging technologies capable of addressing Strategic Portfolio Review, Chairman Gaps, or eroding technological superiority shortfalls. 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, etc.).</p>				
<p>Title: FY 2014 Combatant Commands' (COCOM) Priorities</p> <p>Description: FY 2014 was a transition year for the JCTD program where Department/COCOM emerging priorities deemed significant and consistent with the rebalance were given greater emphasis. In addition, the Pre-EMD prototypes developed will focus in areas of concepts for space defense, solid state technologies for maritime defense, advancements in counter electronic systems and space capability without a space layer (precision navigation and timing, communications, battle-space awareness, international and interagency collaboration (Australian, Canadian, Department of Homeland security)).</p> <p>FY 2014 Accomplishments: Funded the first year of FY 2014 projects selected by Senior Department Leadership to satisfy COCOM Commanders' priority shortfalls.</p> <p>FY 2015 Plans: Fund the second year of the FY 2014 projects that are scheduled to proceed to a second year.</p>		2.700	2.500	-
<p>Title: Department's Strategic Priorities</p> <p>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.</p> <p>FY 2014 Accomplishments:</p>		5.573	33.794	29.490

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Selected projects that demonstrate military utility of integrated capability solutions; demonstrate robust fabrication processes; demonstrate performance in specific operational environment; define form, fit and function; and enable business case analyses.</p> <p>FY 2015 Plans: Explore 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.</p> <p>FY 2016 Plans: Fund second year of the FY 2015 projects that are scheduled to proceed to a second year. Select projects that demonstrate military utility of integrated capability solutions; demonstrate robust fabrication processes; demonstrate performance in specific operational environment; define form, fit, function; and enable business case analyses.</p>				
<p>Title: Low Cost Missile Defeat (LCMD) Prototype</p> <p>Description: LCMD Prototype 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 is structured using a building block approach that first conducts 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. Initial LCMD architecture, specifications, performance and critical technologies were defined, analyzed, and tested in FY 2014 under the Emerging Capabilities and Technology Development Program Element (PE) 0603699D8Z.</p> <p>FY 2015 Plans: During FY 2015, the LCMD program will continue to mature the architecture, initiate building the technology, complete a System Design Review (SDR), Preliminary Design Review (PDR), and prepare for the Critical Design Review (CDR)/Go-No-Go in FY 2016.</p> <p>FY 2016 Plans: In FY 2016, the project will conduct the CDR, Technical Readiness Review (TRR) and continue to develop and complete the technology and subsystems that will provide the foundation and core of an eventual prototype. Future phases of the LCMD project to include subsystems tests, prototype development and prototype testing will be determined in follow on years pending successful reviews and development.</p>		-	20.000	50.000
<p>Title: Advanced Counter Electronic System (ACES) Prototype</p>		1.200	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Description: Emerging Capability & Prototyping Directorate support for technical analyses and reviews and preliminary planning and documentation for a system development program of an advanced electronic countermeasure system(s). (Details are Classified)</p> <p>FY 2014 Accomplishments: Planned security, engineering, vulnerability, concepts of operation, and transition support for an engineering prototype demonstration. (Details are Classified)</p>				
<p>Title: Low Power Module (LPM) Prototype</p> <p>Description: Emerging Capability & Prototyping Directorate 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)</p> <p>FY 2014 Accomplishments: Began efforts to transition technologies developed in the successfully completed Pacific Sail (PACSAIL) JCTD and to eventually merge the capability with the Navy solid state laser technology maturation (SSL-TM) program. (Details are Classified)</p> <p>FY 2015 Plans: Develop concept of operations (CONOP) and associated tactics, techniques and procedures (TTPs). Conduct effects testing. (Details are Classified)</p> <p>FY 2016 Plans: Conduct additional effects testing and operational plan (OPLAN) analyses. (Details are Classified)</p>		0.750	0.950	1.100
<p>Title: Nano-Catalyst Desulfurization Prototype</p> <p>Description: Emerging Capability & Prototyping Directorate is supporting laboratory characterization and production of nano-catalysts for use in prototype development and demonstration of a system of systems to remove sulfur from JP-8 for use in auxiliary power unit fuel cells on heavy tactical vehicles.</p> <p>FY 2014 Accomplishments: Formed the industrial and academia test and development team to conduct laboratory engineering and characterization of the catalyst and to optimize binding of the catalyst to the substrate in a production mode. Demonstrated basic proof of principle of the ability to catalytically remove sulfur. Follow-on development is under review.</p>		0.650	-	-
<p>Title: Ravenscraig Prototype</p>		5.500	9.000	15.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Description: Ravenscraig will provide technical and operational characterization and countermeasures for a class of threat signals. (Details are Classified)</p> <p>FY 2014 Accomplishments: Developed and deployed first prototype. Conducted phase one trade study test. (Details are Classified)</p> <p>FY 2015 Plans: Continue development and demonstration. Conduct phase II testing with controlled platform. (Details are Classified)</p> <p>FY 2016 Plans: Funds prototype for non-operational fielding, experimentation/demonstration. (Details are Classified)</p>				
<p>Title: Salty Siren Prototype</p> <p>Description: Salty Siren will develop an indications and warning capability for countering Anti-Access/Area-Denial (A2/AD) missions. (Details are Classified)</p> <p>FY 2014 Accomplishments: Developed and tested a proof-of-concept design. (Details are Classified)</p> <p>FY 2015 Plans: Refine and test the engineering reference design to include a notional communication support package. (Details are Classified)</p> <p>FY 2016 Plans: Operationalize the field unit and conduct end-to-end acceptance testing. (Details are Classified)</p>		1.000	1.000	1.000
<p>Title: Wasabi Prototype</p> <p>Description: Wasabi will produce a real-time common operational picture of adversary missile and space activity. (Details are Classified)</p> <p>FY 2014 Accomplishments: Completed defining user requirements and delivered initial system prototype. (Details are Classified)</p> <p>FY 2015 Plans: Design data integration and processing infrastructure. (Details are Classified)</p> <p>FY 2016 Plans:</p>		2.800	4.200	4.800

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Implement rule sets to enable collaboration with coalition partners. (Details are Classified)				
<p>Title: Advanced Tactical Data Fusion (ATDF)</p> <p>Description: ATDF is a prototype effort to improve situational awareness by fusing multi-source report and track data into a single composite track picture in real time. ATDF will develop, test, integrate, accredit, install, and demonstrate data fusion analytics that advance the state of the art in tactical data fusion of multiple tracks and multiple sensors in an operational environment in Talisman Sabre-15 (TS-15) force-on-force exercise.</p> <p>FY 2014 Accomplishments: Developed detailed Program Execution Plan. Conducted initial assessment of host ship's Command, Control, Communications, Computers, Collaboration, and Intelligence (C5I) infrastructure. Finalized initial system architecture. Began development of algorithms and integration into the Multi-Sensor Integrator (MSI). Started work on the Temporary Alteration (TEMPALT) design package and accreditation packages. Developed data collection plan. Participated in TS-15 planning conferences and working groups to coordinate exercise participation. Completed development and integration of algorithms into the MSI framework. Completed software integration testing. Completed TEMPALT design package. Accredited system. Installed in a ship during scheduled maintenance downtime. Tested installation and integration with shipboard systems underway. Trained crew. Completed Final Planning Conference and pre-sail preparations. Conducted operational demonstration during TS-15. Completed final report.</p>		2.850	-	-
<p>Title: India Science and Technology Focus Area</p> <p>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, 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. Developing vibrant S&T cooperation is one of the key steps in building an enduring partnership.</p> <p>FY 2015 Plans: Identified topic areas including autonomy, cognitive science, and directed energy science. Example projects include: Improving Cognitive & Artificial Cognition Models; Testing, Evaluation, Verification, and Validation for Autonomous Systems; High Altitude Fatigue Management and Performance Sustainment; Experimental and Computational Studies of Blast & Blunt Traumatic Brain Injury; Bio-Effects of Laser and High-Power Microwave Sources; and Joint Sealed Microwave Source Co-Development.</p> <p>FY 2016 Plans: Continue to develop projects initiated in FY 2015. Additional areas include: munitions development, materiel science advancements, and other identified project areas.</p>		-	5.000	10.000
Accomplishments/Planned Programs Subtotals		141.170	119.790	141.540

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P648 / <i>Joint Capability Technology Demonstration (JCTD)</i>

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. 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:

- 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 achieved transition rates of the following: 70 percent transitioned to a new or existing Program(s) of Record, 24 percent transitioned to fieldable-prototypes (residual capabilities) sustained by non-JCTD funds in direct support of operations in theater. In FY 2014, 17 of 18 completed JCTDs successfully transitioned.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P264 / <i>Disruptive Demonstrations</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P264: Disruptive Demonstrations</i>	-	12.600	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

The "Disruptive Demonstrations" Program code was inserted to support development/demonstration of time-sensitive capabilities that address Secretary/Department Strategic Vectors, and Chairman's Gap Assessment of capability shortfalls. As a result, we anticipate less partner funding for those strategic investment areas and will have to rely on greater partner funding for other JCTD projects. Overall we envision fewer JCTD projects that will be longer in duration.

In FY 2015, funds will be transferred from the JCTD Program Element to PE 0603289D8Z (Advanced Innovative Analysis & Concepts).

A. Mission Description and Budget Item Justification

The program will allocate a portion of the JCTD funding for Disruptive Demonstrations to solve priority shortfalls identified by Department Senior Leadership and the Chairman's Gap Assessment.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Disruptive Demonstrations</p> <p>Description: In FY 2014, the Department allocated a portion of the Joint Capability Technology Demonstration funding line to technology demonstrations specifically aligned to the Department's strategic vectors (Asian-Pacific, low cost, small footprint operations) and the Chairman's Gap Assessment for capability shortfalls. As part of the Strategic Capabilities Office development efforts, analysis, and demonstration of diagnostics for Department of Defense networks; cognitive Intelligence, Surveillance, and Reconnaissance tools to enhance Theater Security Cooperation Plan activities; Command and Control tools for pre- and post-conflict periods; and enhanced Operations Security procedures to protect critical acquisition and operational data will be developed to meet Combatant Command (COCOM) urgent operational requirements. Due to nature of this project, specific descriptions and detailed plans are available at higher classification levels. In FY 2015, funds will be transferred from the JCTD Program Element to PE 0603289D8Z (Advanced Innovative Analysis & Concepts).</p> <p>FY 2014 Accomplishments: Completed delivery design, launch assembly, guidance assembly, sensor payloads, and UAV launch model and mission planner for four unique alternatives to support U.S. Pacific Command urgent and compelling operation needs. Conducted over 100 test launches demonstrating communication between mission planner and launch vehicles. Completed design concept and Preliminary Design Reviews for the four systems. Completed approximately 100 sub-system data collections to develop high</p>	12.600	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603648D8Z / <i>Joint Capability Technology Demonstration (JCTD)</i>	Project (Number/Name) P264 / <i>Disruptive Demonstrations</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
fidelity models. Successfully launched and recovered UAV with full weight payload with mission planner software. Due to nature of these efforts, specific descriptions and detailed plans are available at higher classification levels.			
Accomplishments/Planned Programs Subtotals	12.600	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The primary acquisition strategy for funding Disruptive Demonstrations will be through Military Inter-Departmental Purchase Requests (MIPRS). The specifics of each MIPR will be dependent upon the development center, laboratory, contractor or agency requirements and needs. If an Inter-Agency agreement is required, compliance and coordination of the agreement will be completed in coordination with the receiving activity and Federal Acquisition Regulation 17.5.

E. Performance Metrics

Performance metrics are specific to each Disruptive Demonstration 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. Generic performance metrics applicable to the RDT&E initiatives includes 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 metrics for this objective is to transition 40 percent of completing demonstration programs per year.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	5.075	-	6.980	-	6.980	9.931	12.892	7.931	2.974	Continuing	Continuing
P663: <i>Network Communications Analysis</i>	-	5.075	-	6.980	-	6.980	9.931	12.892	7.931	2.974	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) would be adversely effected in operations in Anti-Access/Area-Denial (A2/AD) environments. The primary threat is from sophisticated electronic warfare whose effects may be enhanced by other techniques. Therefore, 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 robust/resilient and assured communications. The goal is to mitigate degradation across the operational tiers (strategic, operational, and tactical) and domains (nuclear, intelligence surveillance and reconnaissance [ISR], command and control [C2], etc.) to ultimately support the mission needs of Joint Functional Component Commanders (JFCCs), Joint Force Commanders (JFCs), and deployed forces.

The DoD has large investments in TDLs that may have to operate in an A2/AD environment. Examples include communications planning systems (across multiple domains and echelons), situational awareness capabilities with limited automation support for highly dynamic A2/AD environments, aerial networking technologies that create Beyond-Line-of-Sight(BLOS)communications, and networking backbone technologies for disruptive environments. This research will develop new technology and exploit existing methodologies to ensure performance in A2/AD environments. Additionally, this will enable standardization of military network communications capabilities across the Department.

Beginning in FY 2016, the Robust Tactical Data Links Modernization (RTDLM) project will specifically address the need for improvements in robustness and efficiency to the current Link-16, which is the primary data link deployed over 10,000 radios with United States (U.S.) and Allied militaries. It will focus mainly on developing ways to improve the resiliency and range/reachability of the tactical data links lost due to conditions in an A2/AD environment. This will include advanced and improved Link 16 waveform designs, receiver processing algorithms, and advanced data forwarding and routing overlay technologies as well as alternative antenna systems.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	5.000	-	-	-	-
Current President's Budget	5.075	-	6.980	-	6.980
Total Adjustments	0.075	-	6.980	-	6.980
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.228	-			
• SBIR/STTR Transfer	-0.153	-			
• Realignment for Higher Priority Programs	-	-	7.000	-	7.000
• Economic Assumptions	-	-	-0.020	-	-0.020

Change Summary Explanation

FY 2016 internal realignment reflects funding for higher Departmental priorities and requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>				Project (Number/Name) P663 / <i>Network Communications Analysis</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P663: <i>Network Communications Analysis</i>	-	5.075	-	6.980	-	6.980	9.931	12.892	7.931	2.974	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department made the decision to sunset the initial thrust of this program in FY 2014. Tactical Mobile Networking, Spectrum Management Tools and Analysis, and Tactical Networking Evolution and Expansion projects completed the final tasks as listed below.

Currently fielded satellite communications (SATCOM), terrestrial, and Tactical Data Links (TDLs) would be adversely effected in operations in Anti-Access/Area-Denial (A2/AD) environments. Therefore, 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 robust and assured communications.

Robust Tactical Data Links Modernization (RTDLM) – In a contested environment, especially when conducting forward operations, platforms face a significant electronic warfare threat. Improvements in tactical communication systems for Joint airborne networking are required to mitigate advances in threat electronic warfare systems. The RTDLM project will develop advanced technologies to address these needs, design and build 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 2014	FY 2015	FY 2016
Title: Tactical Mobile Networking	0.700	-	-
Description: (NCCP Sunset - Final Report) This project is for the development of new applications and standards that can be used on existing tactical networks to improve data retrieval and discovery by the tactical warfighter. In addition, research is conducted into tactical communications architectures to develop models useful for optimizing and exploiting tactical networks. New applications and architectures will be tested in a joint federated experimental emulation test bed being developed within this program. Project collaboratively executed by the Navy and Air Force. Results planned for transition to programs of record as maturity of models allow. Research efforts include Wireless Computational Networking Architectures (WCNA), Tactical Edge Protocol Evaluation and Experimentation (TEPEE), Mission Aware Reasoning for Tactical Edge Network Services (MARTENS)/Semantically Augmented Resource Manager (SARM), Dynamic Transport Protocol, Satellite Communications (SATCOM) and Tactical NetOps, Mobile Ad Hoc Networking (MANET) Project (with the National Security Agency [NSA]), Cooperative Heterogeneous Communications, Inter-domain Routing, Communications for Autonomous Systems, Network Visualization, Tactical Edge Group-Wise Networking, Advanced Tactical Data Links, Reliable Data Transport, Channel Modeling for Software Defined Radios in Real Atmospheric Environments, and Loss Tolerant Transmission Control Protocol (LT-TCP) for Mobile Wireless Networks.			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>	Project (Number/Name) P663 / <i>Network Communications Analysis</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Overall goals: Increase understanding of the condition of tactical mobile networking technologies. Improve specification of technical standards and policy for tactical mobile networking. Refine fidelity modeling and simulation to support operations analysis and the articulation of operational requirements and performance parameters.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Completed research for Adaptive Rate Video Service (ARViS), Nack-oriented Reliable Multicast (NORM) and NORM Proxy (NORP), Distributed Service Discovery (iNDI/ProtoSD), and Extendable Mobile Ad-hoc Network Emulator (EMANE). - Produced final reports and documentation. 				
<p>Title: Spectrum Management Tools and Analysis</p> <p>Description: (NCCP Sunset - Final Report) This project is for the development of measurement-based spectrum management tools. Applications will be developed and tested in a laboratory environment. Project is executed by the Army and results are available to the Navy and Air Force through the Joint NETOPS Integrated Collaborative Working Group. Research efforts include Spectrum Analysis and Experimentation in Dynamic Operational Environments (SAEDOE), Agile Spectrum and Network Testbench (ASPECT), Dynamic Spectrum Access (DSA) Spectrum Analysis Software, Cognitive Networking Radio Algorithmic Fusion, Integrating Comm and Electronic Attack, SIGINT-assisted Spectrum Management and Control, Cognitive Radio Technology, Networking for Spectrum Aware Cognitive Radios, DSA Enhancements, Spectrum Sharing Trade Study, and Directional Ad hoc Networking Technology - 2 (DANTE - 2).</p> <p>Overall goal: Develop the technical basis to support changes regarding the operational use of spectrum both within the military and among spectrum regulatory bodies.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Integrated spectrum sensing effort, Advanced Real-Time Global Surveillance User Surveillance (ARGUS), with Network End-to-End Monitoring (NEEMO), Intelligent Situational Awareness (ISA), and SATCOM Planning and Execution Services (SPES). - Transitioned spectrum sharing demonstrations for ongoing LTE (Long-Term Evolution) Test and the Soldier Radio Waveform (SRW) Real-Time Frequency Management (SRFM) effort. - Researched spectrum sharing options for cross military and commercial LTE integrated usage. - Conducted two transition demonstrations at the AFRL Stockbridge Spectrum Testing Facility. 		1.000	-	-
<p>Title: Tactical Networking Evolution and Expansion</p> <p>Description: (NCCP Sunset - Final Report)</p>		3.375	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>	Project (Number/Name) P663 / <i>Network Communications Analysis</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>This project is for the development of new applications and approaches that can be used on existing tactical networks to improve the physical and networking layers for the tactical warfighter. It will explore new ways to build architectures, antennas, and signal and data processing or exploit waveforms to improve Anti-Jam resistance, network throughput and scale, or network packet routing, and improve these metrics at low cost and without sacrificing interoperability. Research efforts include Joint Aerial Layer Network (JALN) Network Management/Control Concept Analysis, Advanced Tactical High-Performance Network Architecture (ATHENA), Network Radio Characterization Limited Objective Experiment (LOE), Multi-Function Wave Form (Resilient Electronic Warfare [EW] /Communications[Comms]), and the Asymmetric Broadcast Command and Control System (ABC2) Anti-Access/ Area Denial (A2/AD) Demonstration.</p> <p>Overall goal: Next generation tactical networking in the fielded tactical systems, with vastly increased capabilities, at the lowest cost possible to the DoD.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Transitioned ATHENA to the Robust TDL Modernization (RTDLM) effort. - Transitioned Networks Program network management and situational awareness tools to the Joint Multilayer Command and Control at the Tactical Edge (JMC2TE) effort. - Transferred network management testbeds and CORE/EMANE Tools to the Joint Assessment Research Testbed (JART) in support of JALN-Asia Pacific (JALN-AP) and JALN-NarrowBand (JALN-NB) efforts. 			
<p>Title: Robust Tactical Data Links Modernization (RTDLM)</p> <p>Description: (NCCP New Focus – Initial Project) This program will address both the need for improvements to the current Link-16 data link and the need for advanced directional network systems for current and future advanced tactical fighters and unmanned systems. This project will create effective networking in contested A2/AD environments. Spectrum awareness and adaptive networking significantly mitigates the effectiveness of interference and retains reliable connectivity and C2. The RTDLM project will develop and provide the framework, technologies, experimentation, and analytical efforts to support advances in DoD Tactical Data Links (TDLs). 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.</p> <p>Overall Goal: Increase communication and network performance (i.e. “Buy-Back” degraded capabilities) while improving robustness and availability of these communication waveforms and robust/resilient networks to adversary electronic warfare attack.</p>	-	-	6.980

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603662D8Z / <i>Networked Communications Capability</i>	Project (Number/Name) P663 / <i>Network Communications Analysis</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - Develop adaptive antenna and antenna control subsystems for integration in existing 4th generation fighters and bomber aircraft, 5th generation fighter aircraft, and emerging unmanned and weapons platforms. - Develop improved Link 16 waveform designs, receiver processing algorithms, and advanced data forwarding and routing overlay technologies for improved operations in contested electromagnetic environments. - Develop a flexible prototype implementation of the technologies for development and performance testing in the laboratory and field environments. 			
Accomplishments/Planned Programs Subtotals	5.075	-	6.980

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
The Robust Tactical Data Links Modernization (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.

E. Performance Metrics
The RDT&E goal for Robust Tactical Data Links Modernization (RTDLM) is capability improvements that achieve 70% “Buy-Back” of the tactical data link range ratio and 80% of the area of operation lost in the A2/AD environment.

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 Tactical Data Link enhancements.

Enable DoD leadership with the supporting technical and cost details to identify candidate “building blocks” for timely incremental improvements.

Actual Performance Improvement: Prototype and transition-able designs, software, and hardware; usage of federated test beds; and demonstration of radio prototypes and modeling tools.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	11.150	-	-	-	-	-	-	-	-	Continuing	Continuing
P113: <i>Cyber Advanced Technology Development</i>	-	11.150	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Our military forces require resilient, reliable networks and computer 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 DoD networks to counter those threats and assure our missions. This program focuses on innovative and sustained advanced development in both cyber security and computer network operations to mature new concepts to harden key network and computer components to include: designing new resilient cyber infrastructures; increasing the military’s ability to fight and survive during cyber attacks; disrupting nation-state level attack planning and execution; measuring the state of cyber security for the U.S. government; increasing our understanding of cyber as a war-fighting domain; and providing modeling and simulation of cyberspace operations to explore and exploit new ideas in cyber warfare for agile cyber operations and mission assurance, and protection of tactical networks, weapons systems and platforms.

The Cyber Advanced Technology Development program element (PE) was budgeted in the advanced technology development budget activity because it focused on the maturation of successful applied research results, and their development, into demonstrable advanced cyber security capabilities. The Cyber Advanced Technology Development program built upon the results of matured applied research from the Cyber Applied Research PE (0602668D8Z), and other programs, to develop technology demonstrations for potential transition into capabilities that support the full spectrum of computer network operations. These approaches included moving from cyber defense to cyber resilience by changing the defensive terrain of our existing digital infrastructure, identifying ways to raise the risk and lower the value of an attack from an advanced persistent cyber threat, and focusing on mission assurance metrics.

The program focused on science & technology (S&T) to address joint problems in cyber defense and operations. The focus of the research was on filling capability and technology gaps identified in the Cyber Community of Interest 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)).

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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	9.667	-	-	-	-
Current President's Budget	11.150	-	-	-	-
Total Adjustments	1.483	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.795	-			
• SBIR/STTR Transfer	-0.312	-			

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>				Project (Number/Name) P113 / <i>Cyber Advanced Technology Development</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P113: <i>Cyber Advanced Technology Development</i>	-	11.150	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Cyber Advanced Technology Development program built upon, matured, and transitioned the results of successful applied research results from the Cyber Applied Research PE. The link between the Cyber Applied Research and Cyber Advanced Technology Development PEs was intended to create a mechanism to take existing basic research results and mature them to the point of incorporation into technology demonstrations. This program focused on science & technology (S&T) to address joint challenges in cyber defense and operations. The focus of the research was on filling capability and technology gaps identified in the Cyber Community of Interest 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 Cyber S&T Community of Interest.

Beginning in FY 2013, the program expanded research in cyber command and control to provide warfighters and commanders new situational awareness, course of action analysis, cyber operational agility and cyber mission control. This research included protection of tactical networks, weapons systems and platforms. The six new technical thrust areas were:

- 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 2014	FY 2015	FY 2016
Title: Foundations of Trust	4.815	-	-
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 2014 Accomplishments:			
- Extended host integrity measurement and checking to cloud and virtualized platforms.			
- Implemented trust-based approaches to computer network defense.			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>	Project (Number/Name) P113 / <i>Cyber Advanced Technology Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
- Modeled and analyzed composite trust management schemes that provide increased ability to assess the trustworthiness of complex interconnected systems and software.				
<p>Title: Resilient Infrastructure</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Developed methods for increasing resilience of operational systems. - Developed mechanisms to compose resilient systems from brittle components. 		1.482	-	-
<p>Title: Assuring Effective Missions</p> <p>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. 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Developed foundational cyber interoperability framework to enable rapid integration and reduced acquisition and integration cost for the development of current and future cyber mission operations. 		0.730	-	-
Title: Cyber Modeling, Simulation & Experimentation (MSE)		1.618	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>	Project (Number/Name) P113 / <i>Cyber Advanced Technology Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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 modeling, simulation, and experimentation: 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 experiments, providing the ability to track the progress of cyber research investments in a quantitative fashion. This area will explore 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Developed approaches and tools to incorporate cyber models into mission, physical and kinetic simulations to achieve increased fidelity and coverage. - Developed cyber simulation models that incorporate mission models and cyber-kinetic effects. 				
<p>Title: Embedded, Mobile & Tactical (EMT)</p> <p>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 infrastructures it is of the utmost importance to provide a secure environment where these devices can be effectively utilized, monitored and tracked.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Developed efficient algorithms capable of locating and tracking stationary and mobile emitters to help protect DoD networks from wireless intrusion. 		2.505	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603668D8Z / <i>Cyber Security Advanced Research</i>	Project (Number/Name) P113 / <i>Cyber Advanced Technology Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Developed and tested hardware capable of rapidly providing accurate line of bearing to wireless emitters.			
Accomplishments/Planned Programs Subtotals	11.150	-	-

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• BA 2, PE # 0602668D8Z, P003: <i>Cyber Applied Research</i>	11.637	14.979	13.727	-	13.727	12.966	15.249	15.537	15.748	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603670D8Z I <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing
P370: <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Office of the Secretary of Defense (OSD) Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. The Program exists to optimize U.S. forces' ability to perform population-centric sensing, understand behaviors driven by social and cultural variables, and select effective courses of action in the full range of military operations. Program research will enhance population-centric intelligence, surveillance, and reconnaissance (ISR) capabilities for understanding the increasingly complex global environment to address national strategic challenges such as instability, aggression, proliferation of weapons of mass destruction, and violent extremism. In three integrated program elements (PEs), the Program will conduct applied research, mature and demonstrate advanced technology, and develop transitionable methods, technology, tools and prototypes. Work under PE 0603670D8Z is focused on developing and demonstrating general-use, cross-domain tools in two areas: computational modeling; and sociocultural behavior data collection, management, and dissemination. Research will result in more effective cultural understanding in existing intelligence, influence operations, and operations planning systems; modeling capabilities for forecasting reactions to U.S./coalition actions; demonstration of strategic decision making tools that highlight political, religious, cultural, and related factors; tools and technologies enabling more widespread and effective use of sociocultural behavior models in operations and mission rehearsal; and toolsets that can be used as strategic decision making tools to account for sociocultural factors.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	2.000	-	-	-	-
Current President's Budget	2.000	-	-	-	-
Total Adjustments	-	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>	Project (Number/Name) P370 / <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P370: Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program is focused on developing and demonstrating general-use, cross-domain tools in two areas: computational modeling; and sociocultural behavior data collection, management, and dissemination. Research will result in cultural understanding technologies and overlays to support intelligence, influence operations, and operations planning systems; modeling capabilities for forecasting reactions to U.S./coalition actions; demonstration of strategic monitoring and decision making tools that account for political, religious, cultural, and related factors; tools and technologies enabling more widespread and effective use of sociocultural behavior models in operations. The Program will ensure that supported research is clearly tied to warfighters and their needs.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Modeling Capabilities</p> <p>Description: This project develop and demonstrate computational models to support sensing and forecasting of non-US populations, including their reactions to U.S./coalition informational, military, economic, or political actions. The Program has emphasized development of tools to support forecasting of instability. In addition to refining and extending those tools, the Program is researching and developing comparable models and tools for analysis and forecasting of other events of interest. Work in this area also includes modeling to support analysis of alternative courses of action (COA). This is a challenging objective that requires research, development and integration of constituent technologies. Integrate and demonstrate decision making support tools useful within programs of record and operational user analysis, planning and execution systems for political, religious, cultural and other factors. Support specific operational planning tasks for selected government partners via limited technical demonstration in user settings. In addition, working with operational partners HSCB Program models will be tested in realistic environments by representative users.</p> <p>FY 2014 Accomplishments: Extended the Worldwide Integrated Crisis Early Warning System (W-ICEWS) by developing improved political crisis modeling and improving the ability to track emerging actors and groups that could contribute to instability. Developed, in iTRACE/iCAST, the ability for COCOM-specific focus into news event processing (e.g., trafficking, humanitarian efforts, economic events) and additional instability event forecasting (e.g. coups).</p>	1.000	-	-
<p>Title: Sociocultural Data Collection and Management</p>	1.000	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>	Project (Number/Name) P370 / <i>Human Social Culture Behavior (HSCB) Modeling Advanced Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Description: This project develop and demonstrate tools for improved collection of sociocultural behavior data for multiple operational echelons. Develop and demonstrate tools to support ingest of unstructured data and structuring of data for use in computational modeling for intelligence analysis, operations analysis, and decision support. Specifically address emerging media and other open source data.</p> <p>FY 2014 Accomplishments: Extended the W-ICEWS capability by improving op-tempo for news event processing in iTRACE/iCAST (daily or even real-time as opposed to weekly). Developed a near real time alerting capability that will aid in focusing deeper analytics. Developed capability to add new foreign languages support in the news event processing cycle.</p>			
Accomplishments/Planned Programs Subtotals	2.000	-	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• PE 0602670D8Z BA 2: <i>HSCB Applied Research</i>	2.000	-	-	-	-	-	-	-	-	-	Continuing Continuing
• PE 0604670D8Z BA 4: <i>HSCB Research & Engineering</i>	2.000	-	-	-	-	-	-	-	-	-	Continuing Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	98.558	59.996	90.966	157.056	-	157.056	119.714	97.634	76.962	49.709	Continuing	Continuing
P680: <i>Manufacturing Science and Technology Program</i>	65.420	45.697	19.845	20.245	-	20.245	20.911	22.078	23.798	24.188	Continuing	Continuing
P350: <i>Institutes for Manufacturing Innovation</i>	33.138	14.299	71.121	136.811	-	136.811	98.803	75.556	53.164	25.521	Continuing	Continuing

Note

P350 is a new project number in this budget cycle. Funding for the Institutes for Manufacturing Innovation was included in the FY 2015 President's Budget in P680, and has now been extracted for clarity.

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.

Institutes for Manufacturing Innovation program funding is also included in this program element (first addressed in the FY 2015 President's Budget). 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 (IMI) will serve as regional hubs to accelerate technological innovation into

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>
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commercial application and concurrently develop the educational competencies and production processes via shared public-private sectors. The establishment of the IMIs, 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 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	59.014	91.095	62.640	-	62.640
Current President's Budget	59.996	90.966	157.056	-	157.056
Total Adjustments	0.982	-0.129	94.416	-	94.416
• Congressional General Reductions	-0.028	-0.129			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.000	-			
• SBIR/STTR Transfer	-1.990	-			
• Program Baseline Adjustment	-	-	-0.250	-	-0.250
• Economic Assumptions	-	-	-0.446	-	-0.446
• P350 Institutes for Manufacturing Innovation	-	-	95.112	-	95.112

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: P680: *Manufacturing Science and Technology Program*

Congressional Add: *Industrial Base Innovation Fund (IBIF)*

	FY 2014	FY 2015
Congressional Add Subtotals for Project: P680	25.000	-
Congressional Add Totals for all Projects	25.000	-

Change Summary Explanation

P350 Institutes for Manufacturing Innovation in FY 2016 \$95.112 adjustment: Incorporates phased funding for six institutes, three established as of FY2014, two established in FY 2015, and one to be established in FY 2016.

FY 2014 \$3.0 below threshold reprogramming within AT&L resources to fund P350 Institutes for Manufacturing Innovation requirements.

Congressional General Reductions in both FY 2014 and FY 2015 are for FFRDC.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P680: Manufacturing Science and Technology Program	65.420	45.697	19.845	20.245	-	20.245	20.911	22.078	23.798	24.188	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 2014	FY 2015	FY 2016
Title: Advanced Electronics and Optics	11.450	11.528	11.382
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, radars, conformal sensors, and solder free electronics.			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Increased Thickness for Large Sheet Edge Defined Film-Fed Growth (EFG) Sapphire Production (FY 2016): Establish a repeatable process capable of producing finished sapphire windows with the following dimensions: 13.5" x 24" 0.5". Sapphire sheet production process improvements will transition to current and next generation DoD applications. Applications include F-35 Electro-Optical Targeting System (EOTS), High Mobility Artillery Rocket System (HIMARS), UCLASS, DDG-1000, and other programs that use sapphire panels.</p> <p>Silicon Carbide (SiC) High Efficiency Power Switches (FY 2014-2016): 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 allow 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 - Ground Combat Vehicle (PEO GCS, PM-GCV); Navy - DDG51 Flight III (Electric Ships Office, PMS-320); and Air Force – F-35, F-22 (MEA & F-35 Offices).</p> <p>Mini Short-wave Infrared (SWIR) Cameras and Imagers (FY 2014-2016): 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 1 cm3; 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.</p> <p>Mini Vis - SWIR Cameras and Imagers (FY 2015/2016): 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).</p> <p>Manufacturability of Vertical Cavity Surface Emitting Lasers (VCSELs) – Phase I (FY 2014/2015) (FY 2014 effort jointly resourced with Industrial Base Innovation Funds.) 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 Friend vs. Foe, facial ID, weapons ID; covert wavelengths (808, 850, 975 and 1064 nm, + 1550 nm); 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-</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
OBAT, nLoss, LOS-short, CLRF, Joint Effect Targeting System (JETS), IDNST, TLDS, Big Safari, OEF, OIF, STINGER, ARGUS, and others.			
<p>Manufacturability of Vertical Cavity Surface Emitting Lasers (VCSELs) – Phase II (FY 2016): 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.</p> <p>Vital Infrared Sensor Technology Acceleration (VISTA) High Temp Mid-Wave Infrared (MWIR) Detectors (FY 2016): Establish a critical domestic industrial base for MWIR focal plan arrays (FPA) having capabilities in III-V antimony-based 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.</p> <p>Organic Light Emitting Diode (OLED) Microdisplays - Phase II (FY 2016): Phase I initiated using FY 2014 IBIF resources. 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. \$141.7M savings for aviation (17,700 displays between 2017-2032) x \$8K/unit savings). Applications include F-35 Heads-up Helmet Mounted Display System, Apache, Enhanced Night Vision Goggles, 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.</p> <p>Improved Focal Plane Array (FPA) – Hyperspectral – Phase II (FY 2016): Phase I initiated using FY 2014 IBIF resources. Demonstrate utility of III-V based FPAs for Long-Wave Infrared (LWIR) Hyperspectral (HIS) applications. Up to \$1M/year/sensor</p>			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>	Project (Number/Name) P680 / <i>Manufacturing Science and Technology Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments: Increased Thickness for Large Sheet Edge Defined Film-Fed Growth Sapphire Production: Designed reduced setups to grow a 13.7" x 0.61" and 13.7" x 0.65" cross sections and achieved sufficient volume to grow a 13.7" x 0.65" x 24.2" crystal.</p> <p>Silicon Carbide High Efficiency Power Switches: Increased throughput and decreased cost of power devices through enhanced yield device fabrication processes; continued power device fabrication using 6" substrates.</p> <p>Mini Short-wave Infrared Cameras and Imagers: Improved yields/reduced costs of wafer level processing; improved hybridization yields and costs; applied automation of die/wire bonding to reduce packaging costs; planned for sensor packaging and camera calibration tasks.</p> <p>Manufacturability of Vertical Cavity Surface Emitting Lasers - Phase I: Continued hermetic design and standardized packaging efforts for low-cost/high-volume applications; compatible with Pick-n-Place and Surface Mount Technology PCB-stuffing assembly; using multilayer ceramics and PCB technology consistent with wafer-scale packaging; evaluated cooling technologies.</p> <p>FY 2015 Plans: Silicon Carbide (SiC) High Efficiency Power Switches: Work on 150 mm diameter substrate material; continue epi-layer demonstration task, including warm and hot wall growth reactor development.</p> <p>Mini Short-wave Infrared (SWIR) Cameras and Imagers: Address wafer growth, backside processing, hybridization, sensor packaging, and camera calibration efforts.</p> <p>Mini Vis - SWIR Cameras and Imagers: Begin design and development of additional manufacturing processes for sensor substrate removal. Develop specifications for vis-SWIR devices. Develop test and evaluation methods for extended response to <900 nm.</p> <p>VISTA High Temp MWIR Detectors: Continue efforts to integrate High Operating Temperature MWIR FPA technology developed under the larger VISTA program into the F-35 EODAS system. Plans include FPA fabrication, process optimization and maturation, and supporting integrated dewar cooler assembly field testing.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>	Project (Number/Name) P680 / <i>Manufacturing Science and Technology Program</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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Manufacturability of Vertical-Cavity Surface Emitting Lasers (VCSELs) - Phase I: Explore multilayer ceramics and polychlorinated biphenyl (PCB) technologies, emphasizing low-cost die level packaging compatible with Pick-n-place and Surface-Mount Technology PCB-stuffing assembly lines; apply lower thermal impedance packaging; down-select superior heat pipes and micro-channel coolers.

FY 2016 Plans:
Mini Short-wave Infrared Cameras and Imagers: Plan for device transitions; continue wafer growth/processing, hybridization, sensor packaging, and camera calibration efforts.

Mini Vis - SWIR Cameras and Imagers: Continue manufacturing process implementation and test substrate removal. Fabricate and test devices. Continue development and fabrication of prototype and initial production vis-SWIR devices for initial field trials and deployment.

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. Begin planning for manufacturing and field testing.

Organic Light Emitting Diode Microdisplays -Phase II: Develop direct patterning and Silicon on Insulator (SOI) Backplane; demonstrate critical manufacturing processes (direct patterning: 0.5 um accuracy, linear source process uniformity, SOI: high dynamic range, display uniformity); establish a direct patterning prototype; qualify the SOI process at the foundry; install the final Direct Patterning equipment; conduct SOI and Direct Patterning lot runs; execute an interim Manufacturing Readiness Level assessment; initiate a SOI qualification plan.

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.

Title: Advanced Materials Manufacturing	6.367	4.379	7.022
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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, metamaterials, and Low Observables. 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.</p> <p>Advanced materials manufacturing technologies undergoing development include materials for ballistic survivability and rapid fabrication of structural components.</p> <p>Cold Spray Phase I (FY 2014) : Create a production ready supply chain that will cost-effectively deliver magnesium transmission housings and other high value, high failure-tolerant components repaired with cold spray technology. Reclaim parts that are unserviceable due to corrosion, wear, chafing, or other damage. Develop automated, flexible, and repeatable repair process for production implementation of cold spray. Applications include establishing a new manufacturing capability that can be used to repair other materials (i.e. Al, Ti, steel & Bronze) and produce other coatings (Ni, MCrAlY). Reduced condemnations in the AMCOM SAFR Program. Other applications: 120mm, 155mm, F-35, Seawolf, F-15, F-16, F-18, and B-1.</p> <p>Cold Spray - Phase II Large Structures (FY 2016): Expand the Cold Spray product envelope from 5 ft. to a target of 40 ft. to enable large tubular component repair. Applications include Seawolf Class Submarine Periscopes and TD-63 Actuators.</p> <p>Cast Eglin Steel (FY 2014): Develop affordable casting processes to defeat >5X scalable objective underbody vehicle threats; single piece casting for MK82/SDB I to meet lethality requirements to defeat area targets. Applications include replacing DoD non-compliant weapon systems by 2018 per OSD directive. Estimated \$30K savings/vehicle through process change from welded components to a cast underbody. Estimated \$5K savings/bomb to replace the 110,000 non-compliant wide area cluster munitions.</p> <p>Fastener Fill (Exposed Outer Mold Line Fastener Sealing) (FY 2014): Achieve shorter fastener installation times, (i.e., less than 30 seconds per fastener), and minimal residual cleanup to realize a savings of up to 1,000 hours/aircraft in direct labor, saving 312,000 man-hours/year at F-35 full rate production. Applications include F-35 and other aircraft requiring critical LO performance characteristics.</p> <p>Low Observables (LO) - Phase II (FY 2014): Phase I initiated with Industrial Base Innovation Resources. No manufacturing capability exists for systems to meet mission survivability against advanced threats. The objective is a minimum 10x reduction in cost and minimum 50x increase in availability. Applications include multiple DoD platforms for survivability enhancement.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>40MM M433 Warhead Producibility (FY 2014/2015): 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. 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.</p> <p>Automated and Rapid Boot Installation (FY 2014-2016): 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 LO aircraft acquisition and sustainment communities.</p> <p>Dimensions from Day One (FY 2014-2016): 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 decisions 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.</p> <p>Large Scale Encapsulate Ceramics - Phase II (FY 2016): Phase I initiated using Industrial Base Innovation Fund Resources. 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. Armor panels will be producible in the shapes required by individual vehicles. Estimated cost reduction of \$10K /sq. foot. Applications include 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.</p> <p>FY 2014 Accomplishments: Cold Spray Phase I: Initiated qualification of the UH-60 Sump Housing; automated manufacturing cell tested for production. Cast Eglin Steel: Test results conveyed need for additional analysis to achieve blast thresholds. Designed an improved casting underbody for a full vehicle hull. Fastener Fill (Exposed Outer Mold Line Fastener Sealing): Applied tool evaluation plan through range testing; validated requirements and enhanced ergonomic and material optimization. Tools for trials designed for prototype testing. Low Observables (LO) – Phase II: Evaluated material requirements to support survivability optimization for advance threats.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>40MM M433 Warhead Producibility: set processes and teams in place for the development of injection molding and discrete fragment insertion tooling and processes.</p> <p>Automated and Rapid Boot Installation: Initiated improvements to the detail reductions, physical placement, and adhesive applications for boot configurations; developed ultrasonic hand-held boot hole cutter; began pre-production testing.</p> <p>Dimensions from Day One: set processes and teams in place for the creation of process methodology and identification of required materials not addressed in current predictive software.</p> <p>FY 2015 Plans: 40MM M433 Warhead Improvement Producibility: Develop injection molding and discrete fragment insertion tooling and processes. Optimize mold stages to decrease time to load parts, over-mold parts & transition to follow on stages. Develop fragment insertion methods/tools to reduce time to fill mold with fragments & settle/align fragments; enable mold stage transitions at reduced cycle times.</p> <p>Automated and Rapid Boot Installation: Conduct pre-production evaluations; determine implementation approach; perform First Article delta updates.</p> <p>Dimensions from Day One: Create process methodology and identify required materials not addressed in current predictive software. Test for resin shrinkage and coefficient of thermal expansion. Develop predictive capability methodology training. Evaluate methodology predictions and compare to "as built" hardware of various configurations.</p> <p>FY 2016 Plans: Cold Spray - 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.</p> <p>Automated and Rapid Boot Installation: Develop adhesive application development of the re-configured boots to enable reduced cycle time and improved quality.</p> <p>Dimensions from Day One: Apply lessons learned from analysis to planned configurations; conduct demonstrations.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>Title: Enterprise and Emerging Manufacturing</p> <p>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. Will accelerate delivery of technical capabilities to impact current warfighting operations while reducing cost, acquisition time, and risk of major defense acquisition programs.</p> <p>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 CAD designs 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.</p> <p>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.</p> <p>Field Assisted Sintering Technology (FAST) (FY 2014): Replace comparatively slow, expensive sintering process with the capability to produce fine grained, fully dense materials that are not possible and/or cost-prohibitive with conventional sintering processes (days to minutes). FAST will significantly reduce cycle time for armor materials over 60%, and the near-net-shaped nature of FAST can reduce machining costs by 90% (and overall item cost by more than 20%). Applications: EAPS, JAGM(Army), Small Diameter Bomb (Air Force), Next Generation Warheads, ceramic body and vehicle armor, tungsten kinetic energy penetrators, IR windows, heat sinks for electromagnetic propulsion cooling, insensitive munitions UHTC, height temp leading edge.</p> <p>MTConnect Challenge Phase I (FY 2014): MTConnect is a manufacturing industry standard to facilitate the organized retrieval of process information from numerically controlled machine tools. This project continues the development and implementation of production interactive solutions to contribute to reduced cycle time throughout the factory; production metrics presented in real time using adaptable dashboards; enable real-time actions and decisions based on real time facts and data; correlate planned operations and processing with actual events for enhanced efficiency in the future; develop knowledge-based correlation of processing events with part quality to improve efficiency and reduce rework. Applications span the broad US Industrial Base.</p>	2.880	3.938	1.841

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>MTConnect Challenge - Phase II (FY 2015/2016): Development and implementation of production interactive solutions based on the expansion of MTConnect Challenge will contribute to reduced cycle times and the development of real-time production metrics for adaptable dashboard applications. Applications span academia's role and the broad US Industrial Base.</p> <p>High Power Ultrasonic Assisted Drilling (FY 2015): This project is jointly resourced with FY 2014 Industrial Base Innovation Fund resources. 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%. Potentially impacts all systems that require drilling of holes.</p> <p>Framework for Assessing Cost and Technology (FACT) (FY 2014-2016): Reduce the system engineering development time by 50% compared to traditional trade off studies, and reduce the cost of manufacturing by 10%-15%. Create M777 stabilizer arm performance/production models and federate through FACT architecture. Conduct tradeoff analysis between casting and TIG/MIG welding with delivery of prototype hardware. Expected result: lead time reductions from 12-18 months to 90 days; component cost for the M777 will be reduced by 15%; additional critical M777 and mortar system parts identified. Applications include DoD Systems - Developmental, Block Upgrade, and Legacy Systems.</p> <p>Cyber Security for the Shop Floor – Phase II (FY 2016): Phase I was initiated using FY 2014 IBIF resources. 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.</p> <p>FY 2014 Accomplishments: Field Assisted Sintering Technology (FAST): Demonstrate near-net-shaped EAPS warhead components with FAST; reduce cycle times (and hence cost) of current armor materials with FAST; demonstrate functionally graded armor; fabricate legacy IR materials w/FAST; demonstrate cost-savings while matching or exceeding properties.</p> <p>MTConnect Challenge Phase I: Determined the three award winners. A Mechanical Engineering graduate student from Clemson won the first prize with an application monitoring machine spindle chatter.</p> <p>Framework for Assessing Cost and Technology: Modeled sample data to 3D annotated baseline technical data for insertion to a product lifecycle management (PLM)-to-PLM information data exchange format. Benefits associated with updating design</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>specifications to accommodate welding and machining processes begin for the LTV in FY 2015, with the benefits for the M777 spare parts project also to be realized starting in FY 2015.</p> <p>FY 2015 Plans: MTConnect Challenge - Phase II: Building upon the results of the first MTConnect Challenge, the phase II objective is to focus on challenging Academia's role in support of the MTConnect expansion in Industry implementation.</p> <p>High Power Ultrasonic Assisted Drilling: Advance AcousTech Machining from the current Manufacturing Readiness Level (MRL) of 4 to MRL 6. This will be accomplished through a task based effort focused on Drilling and Milling Studies of Weapons Systems Materials and AcousTech™ Machining Module Refinement.</p> <p>Framework for Assessing Cost and Technology: Accelerate tradeoff analyses for new system production planning to reduce the risk of underperformance and associated costs. Conduct analysis of the logistical implications (assembly, maintenance, and repair times) of the previous projects efforts.</p> <p>FY 2016 Plans: MTConnect Challenge – Phase II: Focus is automation for obtaining and exchanging information on the factory floor. Select a module developer, and develop the base module. Select an app portal developer and develop the app portal. Define metrics and methodologies for testing. Develop judging criteria and initiate development of the challenge test bed.</p> <p>Framework for Assessing Cost and Technology: Develop prediction capabilities pertaining to the life cycle sustainment cost implications of alternative designs.</p> <p>Cybersecurity for the Shop Floor – Phase II: Follow-on from Phase I Red Team evaluation 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.</p>			
Accomplishments/Planned Programs Subtotals	20.697	19.845	20.245

	FY 2014	FY 2015
Congressional Add: Industrial Base Innovation Fund (IBIF)	25.000	-
FY 2014 Accomplishments: Cyber Security for the Shop Floor – Phase I: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title “Enterprise and Emerging Manufacturing.”		

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	FY 2014	FY 2015
High Power Ultrasonic Assisted Drilling: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title "Enterprise and Emerging Processes."		
Improved Focal Plane Array (FPA) Production – Hyperspectral (HIS) - Phase I: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title "Advanced Electronics and Optics."		
Large Affordable Substrates - Phase II Space Applications: Developed a domestic capability to produce cadmium zinc telluride (CZT) and enabled a second source of substrate material for mercury cadmium telluride (HgCdTe) infrared focal plane arrays for space applications.		
Large Scale Encapsulate Ceramics – Phase I: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title "Advanced Materials Manufacturing."		
On Tool Inspection for Automated Fiber Placement: Automated fiber placement inspection using sensors mounted on the fiber placement head. Replaced manual inspection processes which are time-consuming, dependent on inspector alertness, and expensive. Provided a basis for a commercially-viable product to be applied in the production of aircraft. Generated significant improvement in detection capability (from <95% to >95%), increased inspection rate (.25 square meter/min to 2 square meter/min), and generated electronic tracking for reduction of paper and quality trending.		
Organic Light Emitting Diode (OLED) Microdisplays - Phase I: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title "Advanced Electronics and Optics."		
Radar Affordability Initiative: Reduced development and acquisition cost for multiple radar & EW systems. These improvements in design and processing will result in a cost savings of greater than 20% per module: AN/TPS-80 savings of \$1M per radar; \$39M for FRP Lot 2 (39 radars); AN/TPQ-50 savings of \$200K per radar.		
Scalable Optical Network Producibility: Created a design approach using noval components and fiber fabric for the F-35 EW system that generates significantly lower production and maintenance costs throughout the life of the F-35 program. Enhanced the implementation of single mode analog and digital fiber optic architecture to support legacy system updates to platforms such as F-22 and F-18.		

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	FY 2014	FY 2015
Solid Rocket Motor Digital Factory: Improved the capability for production surge on multiple workloads, generating a targeted 20% cost reduction that immediately impacts future workloads.		
Transparent Ceramic Blast Shield: Improved transparent spinel powder processing, green forming, densification, and finishing processes to produce 1.5 ft2 size transparent armor parts. Incorporated the spinel parts into a new armor system.		
Manufacturability of Vertical-Cavity Surface Emitting Lasers (VCSEL) Phase I: FY 2014 effort jointly resourced with IBIF and core funds. See project description above under project title "Advanced Electronics and Optics."		
Congressional Adds Subtotals	25.000	-

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• (BA3) 0603680F: <i>Air Force ManTech</i>	-	-	-	-	-	-	-	-	-		
• (BA3) 0603680N: <i>Navy ManTech</i>	-	-	-	-	-	-	-	-	-		
• (BA7) 0708045A: <i>Army ManTech</i>	-	-	-	-	-	-	-	-	-		
• (BA7) 0708011S: <i>DLA ManTech</i>	-	-	-	-	-	-	-	-	-		

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P350: Institutes for Manufacturing Innovation	33.138	14.299	71.121	136.811	-	136.811	98.803	75.556	53.164	25.521	Continuing	Continuing

Note

P350 is a new project number in this budget cycle. Funding for the Institutes for Manufacturing Innovation was reported in the FY 2015 President's Budget in P680, and has now been extracted for clarity.

A. Mission Description and Budget Item Justification

Technological 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 (IMIs), 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 IMIs 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 six DoD-led IMIs addressed in this budget is expected to be self-sustaining, without reliance on federal sustainment funding, by the end of the 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 IMI will be on a specific project basis by the requirements generators, either within or external to DoD.

Each of the six DoD-led IMIs 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

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The first and second year of each of these new non-profit business entities is devoted to creating a sustainable business model, with follow-on refinement through the final year, including: growing the membership of each Institute as appropriate; initiating revenue streams (e.g., membership fees, training and workforce development, certification and licensing, etc.); establishing provisional Executive Board and Technical Advisory committees to execute the business of each institute; finalizing Intellectual Property plans; developing technology roadmaps to inform investment strategies; 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 IMIs; 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.

Each established Institute for Manufacturing Innovation was selected through a competitive process. The executing DoD Service published a formal solicitation for proposals for each IMI, describing extensive proposal evaluation criteria. Non-Profit Organizations and Universities were eligible to bid, and each bidder formed a broad consortium of industry and academic partners for its proposal team. The executing DoD Service used a team of government experts to evaluate each proposal against the evaluation criteria and selected a winning consortium.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Title: Institute #1 – Additive Manufacturing Innovation Institute</p> <p>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. The mission of the IMI is to accelerate additive manufacturing technologies to the U.S. manufacturing sector and increase domestic manufacturing competitiveness. 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 IMI was established in 2012, with cooperative agreement funding contribution included in this budget through FY 2016.</p> <p>FY 2014 Accomplishments: The additive manufacturing IMI was established with over 125 industry, academic, and non-profit members from 37 U.S. states, working in consonance with government and industry stakeholders, and generated \$18 million in cost share; completed two project calls and awarded over 30 project contracts totaling \$48 million public and private funding, of which \$13.5 million is PE 0603680D8Z funding. These first two rounds of applied R&D projects were concentrated in the following critical technology elements: design aids and applications, material characterization, and standards/protocols. Developed education and workforce training roadmap.</p> <p>FY 2015 Plans: Launch a third call for R&D projects based on an updated technology roadmap developed from the technical strategy workshops held in late 2014; competitively review and award additional applied research projects with highest potential for industry and government shared benefit; launch a challenge or series of challenges/prizes surrounding additive manufacturing topics to</p>	-	14.000	8.842

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>encourage highly innovative approaches to problems of buildings infrastructure. Launch education and workforce training initiatives, including partnering with the U. S. Special Operations Command and an existing additive manufacturing education and workforce development program that includes a one-year additive manufacturing certification program for Level One Technicians targeting retraining of wounded warriors.</p> <p>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; launch a challenge or series of challenges/prizes surrounding additive manufacturing topics to encourage highly innovative approaches to problems of buildings infrastructure; continue education and workforce training initiatives.</p>			
<p>Title: Institute #2 – Digital Manufacturing and Design Innovation Institute</p> <p>Description: This national institute focus is on the development of model-based design methodologies, virtual manufacturing tools, and sensor and robotics-based manufacturing. Advanced design and manufacturing tools that are digitally integrated and networked across enterprises and supply chains can lead to the 'factories of the future, forming an agile U.S. industrial base with significant speed to market advantage. This IMI was established in February 2014, with cooperative agreement funding contribution included in this budget through FY 2018.</p> <p>FY 2014 Accomplishments: This IMI was established with 73 industry, academic, and non-profit members from 17 U.S. states, working in consonance with government and industry stakeholders, and generated pledges of \$105 million in cost share; conducted the first round of R&D project calls based on the IMI's Technology Road Map; awarded 18 project contracts totaling \$20.5 million in public and private funding, of which \$12 million is PE 0603680D8Z funding, with a focus on transitioning capability to the organic and commercial industrial base. These first-round applied R&D projects were awarded in the following key core areas: Adaptive Vehicle Make transition (DARPA funded), advanced manufacturing enterprise, intelligent machines, advanced analysis, cyber manufacturing system security and driving open source digital manufacturing commons throughout multiple supply chains.</p> <p>FY 2015 Plans: Project calls are planned to occur approximately every six months. Award projects in 10 proposal calls totaling about \$10 million in PE 0603680D8Z funding in the key core areas, which include but are not limited to: advanced manufacturing enterprise, intelligent machines, advanced analysis, and cyber manufacturing system security.</p> <p>FY 2016 Plans:</p>	6.150	14.125	27.233

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>	Project (Number/Name) P350 / <i>Institutes for Manufacturing Innovation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Project calls are planned to occur approximately every six months. Conduct multiple project calls and award projects in the key core areas which include but are not limited to: advanced manufacturing enterprise, intelligent machines, advanced analysis, and cyber manufacturing system security.			
<p>Title: Institute #3 – Lightweight and Modern Metals Manufacturing Innovation Institute</p> <p>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 IMI 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. This IMI was established in February 2014, with cooperative agreement funding contribution included in this budget through FY 2018.</p> <p>FY 2014 Accomplishments: This institute was established with over 80 industry, academic, and non-profit members from 22 U.S. states, working in consonance with government and industry stakeholders, and generated pledges of \$93 million in cost share; conducted the first round of R&D projects based on initial proposals submitted, and awarded contracts totaling approximately \$10 million of PE 0603680D8Z funding, with a focus on transitioning capability to the organic and commercial industrial base. These first-round applied R&D projects were awarded in the following key core areas: produce and lower the manufacturing cost of lightweight metal components, identify applications for new/novel metals and alloys, improve primary and secondary metal manufacturing processes, develop products exploiting lightweight and modern metals, and initiate steps to ensure the workforce is pipelined to the needs of this technology.</p> <p>FY 2015 Plans: Project calls are planned to occur every six months, valued at approximately \$10 million in PE 0603680D8Z funding for the year. Award second and third round of projects in the key core areas which include but are not limited to: applications of new/novel metals and alloys, primary and secondary metal manufacturing processes, and development of additional products utilizing lightweight and modern metals.</p> <p>FY 2016 Plans: Project calls are planned to occur every six months, valued at approximately \$10 million in PE 0603680D8Z funding for the year. Conduct project call rounds four and five and award projects in the previously described key core areas.</p>	8.149	13.125	27.584
<p>Title: Institute #4 Integrated Photonics Manufacturing Innovation Institute</p>	-	20.000	26.677

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>	Project (Number/Name) P350 / <i>Institutes for Manufacturing Innovation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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 IMI 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 IMI will be established in 2015, with cooperative agreement funding contribution included in this budget through FY 2019.</p> <p>FY 2015 Plans: FY 2015 Plans Award a Cooperative Agreement, and stand up this new IMI following processes used for previous institutes while refined through lessons learned. Conduct initial technology roadmapping activities. Complete a data call for a first round of applied R&D projects and award project contracts in the key core areas identified in the roadmapping phase.</p> <p>FY 2016 Plans: Conduct two new rounds of applied R&D project calls and award projects in the key core areas identified in the roadmapping phase.</p>			
<p>Title: Institute #5 – Flexible Hybrid Electronics Manufacturing Innovation Institute</p> <p>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 production processes for high speed pick-and-place, printed circuits, and hybrid fabrication that will enable defense and commercial applications in wearable electronics, unattended sensors, medical prosthetics / neuro-synthetic devices, and the continuous improvement in SWAPC (Size, Weight And Power plus Cost) for electronic systems. This institute will establish a complete 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 IMI will be established in 2015, with cooperative agreement funding contribution included in this budget through FY 2019.</p> <p>FY 2015 Plans:</p>	-	9.871	29.628

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603680D8Z / <i>Defense Wide Manufacturing Science and Technology Program</i>	Project (Number/Name) P350 / <i>Institutes for Manufacturing Innovation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Award a Cooperative Agreement and establish this new IMI following processes used for previous institutes and refined through lessons learned in solicitations and standup of for Institutes 1-4. Conduct initial technology road mapping activities. Complete a data call for a first round of applied R&D projects and award project contracts in the key core areas identified within the road mapping activities. FY 2016 Plans: Continue to refine core investment areas supporting the innovation ecosystem. Initiate two rounds of applied R&D project calls in core areas.			
Title: Institute #6 - Technical Area Selection Pending Description: This institute is in acquisition planning to be established in early 2016, focusing investment in one of the following four candidate technical areas: Engineered Nano-Materials, Electronics Packaging and Reliability, Aerospace and Space Grade Composites, and Modern Fibers and Textiles. This IMI will be established in 2016, with cooperative agreement funding contribution included in this budget through FY 2020. FY 2016 Plans: Award a Cooperative Agreement and establish this new IMI following processes used for previous institutes and refined through lessons learned in solicitations and standup of for Institutes 1-4. Conduct initial technology road mapping activities. Complete a data call for a first round of applied R&D projects and award project contracts in the key core areas identified within the road mapping activities.	-	-	16.847
Accomplishments/Planned Programs Subtotals	14.299	71.121	136.811

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Although each institute will formally adopt and implement its own metrics, the institutes will measure their performance in the following common areas: 1) Degree of Institute self-sustainability (operations revenue / expenses); 2) technologies transitioned to production; 3) technology project execution performance; 4) member participation; 5) education & workforce outreach; 6) success stories.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	64.236	52.535	33.658	33.515	-	33.515	32.079	31.344	39.683	40.219	Continuing	Continuing
P795: <i>Emerging Capabilities Technology Development</i>	64.236	33.535	33.658	33.515	-	33.515	32.079	31.344	39.683	40.219	Continuing	Continuing
P369: <i>Disruptive Technology Demonstrations</i>	0.000	19.000	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

The Emerging Capabilities Technology Development (ECTD) Program Element (PE) supports a shift in focus throughout the Office of the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping (DASD (EC&P)) to producing risk-reducing 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 will execute projects in collaboration with government labs, academia, and industry 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.

In FY 2015, Disruptive Demonstrations (Project P369) funding was transferred from PE 0603699D8Z ECTD to PE 0603289D8Z (Advanced Innovative Analysis and Concepts).

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 dismantled soldier systems.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603699D8Z I <i>Emerging Capabilities Technology Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	53.967	33.706	34.784	-	34.784
Current President's Budget	52.535	33.658	33.515	-	33.515
Total Adjustments	-1.432	-0.048	-1.269	-	-1.269
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.026	-			
• SBIR/STTR Transfer	-1.406	-			
• Realignment for Higher Priority Programs	-	-	-1.174	-	-1.174
• FFRDC Adjustments	-	-0.048	-	-	-
• Economic Assumptions	-	-	-0.095	-	-0.095

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>				Project (Number/Name) P795 / <i>Emerging Capabilities Technology Development</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P795: Emerging Capabilities Technology Development</i>	64.236	33.535	33.658	33.515	-	33.515	32.079	31.344	39.683	40.219	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 2014	FY 2015	FY 2016
Title: Low Cost Missile Defeat (LCMD) Prototype	4.200	-	-
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 is structured using a building block approach that first conducts a technology demonstration effort under the 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 2014 Accomplishments: An Analysis Plan was developed that identified validated models and simulations to define the LCMD architecture. This project developed system specifications, determined system performance and determined technology maturation status. Additionally, the required performance characteristics of the LCMD critical technologies were defined and the technology maturation plan and risk assessment methodology were developed. Future phases of the LCMD project will be determined in the year of execution. In FY 2015, this effort is continued under Program Element 0603648D8Z.			
Title: Multimodal Hostile Fire Detection System	2.184	2.500	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>	Project (Number/Name) P795 / <i>Emerging Capabilities Technology Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Description: The Multimodal Hostile Fire Detection System (MHFDS) integrates multiple hostile shot detection technologies through data fusion algorithms and ballistic models. The system will be designed to conduct point-of-origin shot detection and classify threats in multi-shooter scenarios. This effort is a critical subsystem for RRTO's 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)).</p> <p>FY 2014 Accomplishments: In FY 2014, the MHFDS project conducted data fusion algorithm development, conducted analyses of alternatives and procured communications and sensor hardware. The project also completed hostile shot detection test events at Yuma Proving Grounds, Arizona and Fort Harrison, Montana. The project received a research endorsement from the Maneuver Support Center of Excellence (MSCoE), Capability Development and Integration Directorate. MHFDS directly addresses a required attribute for the Army GBOSS(E) program.</p> <p>FY 2015 Plans: The MHFDS project will continue development and integration efforts and conduct a prototype demonstration. This test will demonstrate small arms multi-shooter detection, providing Point-of-Origin and weapon identification information. In FY 2015, the project will also focus on integrating with the Remote Weapon Station (RWS) Auto Prioritization, Targeting, and Operator Cueing (RAPTOR) system. In FY 2016, the project will continue development efforts with prior year funds, 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.</p>			
<p>Title: X-Lab</p> <p>Description: X-Lab is a research effort to prototype and demonstrate a process to detect early indications of activities leading to a terrorist or state-sponsored attack using weapons of mass destruction (WMD). The principal focus of this effort is on emergent biological-based threats. X-Lab will demonstrate 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 preparation of antidotes.</p> <p>FY 2014 Accomplishments: The X-Lab project established an analytic framework that supports large data handling and exploitation relevant to the Bio-WMD problem that includes initial analytics and workflows. The project developed and demonstrated initial analysis tools. The program developed a testbed for developing, testing and evaluating data analysis tools and workflows. This testbed provided a platform for development by the broader community for ongoing refinement and expansion of methods.</p> <p>FY 2015 Plans:</p>	1.500	2.000	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>	Project (Number/Name) P795 / <i>Emerging Capabilities Technology Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>The X-Lab project will implement an infrastructure, process, and analytic tools for detection of precursor activity related to the execution of a biological WMD attack. The performance of this capability will be assessed in part through demonstrations that will involve analysts operating in a nominal Red-Blue game format. These demonstrations will be conducted in accelerated real-time with analysts applying data mining tools against realistic datasets. ECTD funding for X-Lab will conclude in FY 2015. Following the FY 2015 demonstrations, the research analytics and methodologies developed under this effort will transition to the Services, COCOMs and other government organizations for use in their operational intelligence cells.</p>				
<p>Title: Remote Weapon Station (RWS) Auto Prioritization, Targeting, and Operator Cueing (RAPTOR)</p> <p>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).</p> <p>FY 2014 Accomplishments: In FY 2014, the RAPTOR project focused on Human Systems Integration analyses and Warfighter experimentation to aid in refining integration requirements. The project also started developing the necessary algorithms for RWS cueing, pointing, detection and tracking capabilities.</p> <p>FY 2015 Plans: All RAPTOR systems engineering will be completed in FY 2015. The project will conduct a Preliminary Design Review and a Critical Design Review. The project will also focus on integrating with the Multimodal Hostile Fire Detection System (MHFDS) and hardware components from partner organizations.</p> <p>FY 2016 Plans: In FY 2016, the project will complete development of a man-in-the-loop, semi-autonomous 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 coordinated demonstration in a hasty defense scenario.</p>		1.075	1.300	1.400
<p>Title: Product Architectures, Design and Manufacturing for Operational Responsiveness</p> <p>Description: This project demonstrates 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</p>		1.250	1.250	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>serves as a test bed for research in system physical and autonomy architectures and their complementary design tools and in applying additive manufacturing to accelerate manufacture by orders of magnitude.</p> <p>FY 2014 Accomplishments: In FY 2014, the project produced an initial prototype system and measured the operational responsiveness of the system in terms of total cycle time and suitability to operational missions.</p> <p>FY 2015 Plans: In FY 2015, the project will produce a final prototype system and training materials for a Structures Design Module. Final measures of operational responsiveness and training metrics will be provided. The UAS architecture will be readily transferrable to operators and the training material will be available for use and will transition for further toolset development with the Naval Air Systems Command.</p>				
<p>Title: Battlespace Environmental Monitoring System (BEMS)</p> <p>Description: This project is developing 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 forces if they are being illuminated by certain unexpected RF sources and report unusual RF emission patterns that are detected in the environment. The project includes the production and fielding of a distributed set of six units to three operational naval non-combatants that operate in high risk environments.</p> <p>FY 2014 Accomplishments: In FY 2014, the BEMS project produced prototype systems and completed testing on all units. The systems have been prepared for deployment in FY 2015. ECTD funding for this effort completed in FY 2014. In FY 2015, the effort will transition to the Navy for funding of the deployment of the units to operational users and the collection of feedback reports.</p>		1.000	-	-
<p>Title: Stiletto Maritime Demonstration Program</p> <p>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 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. Stiletto offers a streamlined experimentation and demonstration process that encourages system developers to engage</p>		2.500	2.500	2.500

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>	Project (Number/Name) P795 / <i>Emerging Capabilities Technology Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>directly with the warfighter in the maritime environment to rapidly adapt technologies around operational needs. The Stiletto vessel is home-ported in Norfolk, Virginia.</p> <p>FY 2014 Accomplishments: Emerging capabilities and technologies were demonstrated on Stiletto during three capability demonstrations with operational commands and interagency partners. Stiletto also participated in joint operational demonstrations and exercises including a Maritime Technical Experimentation event with U.S. Special Operations Command (USSOCOM) and the Trident Spectre 2014 interagency exercise. Stiletto's FY 2014 capability demonstrations focused on demonstrating integrated situational awareness capabilities to support expeditionary, coastal and riverine operations; mobile capabilities to support USSOCOM's maritime activities; and, emerging solid state radar systems supporting the interagency combatant craft stakeholder community. Stiletto hosted and demonstrated forty separate technologies during the two-week Trident Spectre 2014 exercise. Technology demonstration events were conducted with radar system developers, maritime Unmanned Aerial Vehicles (UAV) manufacturers, maritime disablement capability developers, and other non-traditional businesses. In FY 2014, Stiletto demonstrated 109 technologies and achieved a cost avoidance to the DoD of \$11.700 million. Stiletto supported 19 small businesses and 10 foreign companies.</p> <p>FY 2015 Plans: The Stiletto Maritime Demonstration Program will continue, and will focus maritime efforts on autonomous capabilities, situational awareness, net-centric operations and electronic warfare/electronic protection technologies. Emerging capabilities will continue to be demonstrated on Stiletto during three capability demonstrations with operational commands and interagency partners, as well as joint operational demonstrations and exercises including Trident Spectre. Capability demonstrations are planned to showcase maritime UAV launch and recovery capabilities to support Naval Special Warfare and the United Kingdom Ministry of Defence stakeholders; a littoral operations center concept; and communications capabilities while on-the-move at sea. Projects will focus on partnerships with the U.S. Navy, U.S. Coast Guard, U.S. Army Watercraft Systems, USSOCOM, U.S. Southern Command (USSOUTHCOM), the Intelligence Community and other operational users. Technology demonstration opportunities will continue to be offered to non-traditional businesses to help mature their systems and increase engagement with the warfighter in the development process.</p> <p>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 Watercraft Systems, U.S. Marine Corps, USSOCOM, USSOUTHCOM, the Intelligence Community and other operational users. Technology demonstration opportunities will continue to be offered to non-traditional businesses to help mature their systems and increase engagement with the warfighter in the development process.</p>				
Title: Technology Assessments		-	1.500	1.500

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>	Project (Number/Name) P795 / <i>Emerging Capabilities Technology Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Description: The Joint Experimentation Range Complex at Yuma Proving Grounds, Arizona, is a Technology Demonstration and Assessment venue developed to examine and explore emerging technologies and prototypes in a desert environment. In FY 2015, the Rapid Reaction Technology Office (RRTO) is sponsoring six two-week evaluation periods for interested industry and government representatives, as well as foreign partners, to demonstrate emerging capabilities in a realistic desert environment. The sponsored demonstration period gives non-traditional and other businesses easy access to realistic environments for informal evaluation of emerging technologies. The results of these evaluations enable improvements to the prototype systems, inform the procurement process for future enhanced capabilities and alert operational users of capabilities in development.</p> <p>FY 2015 Plans: In FY 2015, the RRTO plans to conduct six two-week evaluation periods for interested industry and government representatives, as well as foreign partners, to test emerging capabilities in a realistic desert environment. Also in FY 2015, a technology demonstration will be conducted in support of efforts to identify alternatives to anti-personnel landmines. The Department of Defense (DoD) will use the results of these evaluations to inform the development/procurement process for future enhanced capabilities and to inform operational users of capabilities in development.</p> <p>FY 2016 Plans: The Joint Experimentation Range Complex will continue to be offered as a technology demonstration and evaluation venue for interested industry and government representatives to test emerging capabilities in a realistic desert environment. Specific technology demonstrations will be planned in response to needs identified through engagement with operational users and interagency partners.</p>				
<p>Title: Thunderstorm</p> <p>Description: This portfolio examines and explores emerging technologies and prototypes via a series of technology demonstrations and other activities conducted by the RRTO within the DASD(EC&P). Thunderstorm enhances interagency and international collaboration and provides the DoD and participating partners with an opportunity to evaluate and assess the capabilities of new and emerging technologies. 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 areas. 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.</p> <p>FY 2014 Accomplishments:</p>		2.500	2.500	2.500

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

	FY 2014	FY 2015	FY 2016
<p>Thunderstorm Spirals 14-1, 14-2, 14-3 and 14-3A planning began in late FY 2013. All FY 2014 Spirals capitalized on the lessons learned from previous spirals with special emphasis on information sharing; mitigating barriers to information sharing and evaluating prototype technologies. Spiral 14-1 was a stand-alone threat convergence analyses designed to explore existing and nascent technology in an effort to expose threats to our national security; specifically those described as "Black Swan" events. Spiral 14-2 was a Distributed Tabletop effort that focused on countering chemical and biological Weapons of Mass Destruction (WMD) in a maritime environment and served as a precursor to the 14-3 Field Demonstration. The Spiral 14-3 field demonstration took place in the southeast United States. Key operational partners included the Joint Interagency Task Force South (JIATF-S), United States Coast Guard (USCG), Defense Threat Reduction Agency (DTRA), U.S. Customs and Border Protection (CBP), Federal Bureau of Investigation (FBI), Office of Naval Intelligence (ONI), National Reconnaissance Office (NRO), National Intelligence-Geospatial Agency (NGA), Homeland Security Investigations (HSI), Joint Program Executive Office (JPEO) for Chemical and Biological Defense, and Special Operations Command (SOCOM). Spiral 14-3A was an adjunct effort in partnership with the Edgewood Chemical Biological Center (ECBC). Four chemical/biological detection technologies that showed exceptional promise in Spiral 14-3 were invited to ECBC to evaluate their systems in a more realistic environment. In FY 2014, Thunderstorm demonstrated a total of 55 technologies and transitioned eight technologies to operational end users. In addition, five of the technologies have informed follow-on research and development investment and another five have informed the development of agency tactics, techniques and procedures.</p> <p>FY 2015 Plans: Thunderstorm FY 2015 spirals will build on the experience garnered from previous spirals. Thunderstorm FY 2015 activities will focus on counter-Weapons of Mass Destruction (WMD) capabilities in the Arctic environment and assessment of technology alternatives to anti-personnel landmines. The FY 2015 Thunderstorm spirals will include table top exercise as well as field demonstrations, which will include technologies from U.S. and foreign firms.</p> <p>FY 2016 Plans: Thunderstorm will continue to reflect the most exigent challenges to DoD and provide a venue to explore new and innovative technological solutions.</p>			
<p>Title: Low Cost Innovative Projects</p> <p>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.</p> <p>FY 2014 Accomplishments:</p>	13.018	3.858	4.865

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> •Buoyant Body Armor (BBA): The Buoyant Body Armor (BBA) project completed an analysis of novel ceramic manufacturing processes and developed four sets of test articles and completed ballistics testing at Naval Surface Warfare Center Dahlgren Division. BBA is intended to develop a lightweight, flexible, and buoyant body armor prototype with multi-hit capability. FY 2014 test results informed current acquisition efforts with the Marine Corps Systems Command (MARCORSYSCOM) and U.S. Special Operations Command (USSOCOM). •Humanitarian Assistance/Disaster Relief (HA/DR) Science & Technology Test Center: The Humanitarian Assistance/Disaster Relief (HA/DR) Science & Technology Test Center established partnerships and identified a location for an ongoing capability for evaluating expeditionary and HA/DR technologies in a Southeast Asian tropical environment. •Spectral Management: The Spectral Management project developed materiel camouflage solutions for U.S. Army, U.S. Navy and U.S. Marine Corps dismounted personnel and addressed vulnerabilities in the electromagnetic spectrum. In March 2014, the project completed testing of initial test articles in Hawaii with the support of the U.S. Marine Corps Weapons Training Battalion and completed live fire testing at Marine Corps Base Quantico, Virginia. •Augmented Reality Clip-On (ARCO): ARCO integrated multiple situational awareness information sources directly into a thermal imager for use with night vision goggles. The system provides a heads-up display (HUD) that delivers a day/night-time vision, thermal imaging, navigation and route planning capabilities. •Spatial Iris: The Spatial Iris project kicked off planning to develop and field software that enables the manual and digital mobile data collection of geospatial intelligence in austere environments by DoD, interagency organizations and host nation partners. The software enables persistent domain awareness of transnational criminal organizations, counterinsurgency, humanitarian assistance/disaster relief and civil affair activities. It enables users to monitor trends and perceptions in high-threat countries with minimal cost and risk. The project will complete iterative development and field testing in Honduras and Syria. This project continues in FY 2015. •Managing the Space Environment: The Managing the Space Environment project delivered a critical overview of credible technologies, prototypes and concepts for understanding, observing and managing the space environment through space debris mitigation, commercial space situational awareness capabilities and space-based orbital servicing. •Naval Underwater Threat Interrogation and Covert Assessment System (NAUSICAS): NAUSICAS completed testing in California in FY 2014. The Navy and Joint Improvised Explosive Device Defeat Organization (JIEDDO) worked toward a successful prototype system that will lead to the development of an operationally deployable prototype. •Spar Tactical Sensor Mast: The Spar Tactical Sensor Mast, a deployable ocean sensor system will increase situational awareness in limited access areas. The Naval Surface Warfare Center Dahlgren released a solicitation to build the Spar in FY 2014. Development and evaluation during deployment are planned for FY 2015. •Inflatable Catamaran Hull and Frame Development: Inflatable Catamaran Hull and Frame Development completed testing in FY 2014 and transitioned the capabilities to the Navy's Combatant Craft Light Mark 1 program. The new hull design provides significantly increased speed, range, payload and improved riding. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> •Two projects focused on developing prototype capabilities for Maritime Disablement Operations were started in FY 2014 in partnership with the U.S. Navy Director of Expeditionary Warfare, Naval Special Warfare, and other partners. Details of these prototype efforts are classified. •Electric-Vertical BAT (E-VBAT): In FY 2014 the E-VBAT, an electrically-driven vertical takeoff and landing (VTOL) unmanned aircraft system (UAS), was delivered for maritime launch and recovery demonstrations from the Stiletto maritime demonstration vessel. The E-VBAT will support missions in the areas of organic situational awareness (optics payload), maritime disablement operations (polymer kelp payload), maritime intelligence, surveillance and reconnaissance (ISR payload) and marine atmospheric boundary layer (oceanographic environmental data acquisition payload). •Information Operations Assessment Foundation: The Information Operations Assessment Foundation project identified best practices in DoD, industry and academia to help develop and refine processes and tools for information operations assessments. The project was completed in FY 2014 and transitioned to the Joint Information Operations Warfare Center (JIOWC). •NETp-1: Transitioned the NETp-1 influence assessment training capability project in FY 2014 to the Joint Staff-J8 for use in both influence assessment and Theater Campaign Planning. •CVE Messaging Impact: The CVE Messaging Impact project delivered a Web-based counter-messaging prototype tool to the interagency Center for Strategic Counterterrorism Communications (CSCC) hosted at the State Department. The project completed its development in FY 2014 with delivery of these tools. Discussions are ongoing with other potential Combatant Command (COCOM) users related to transition of the capability. •Warrior Resiliency Course: Initiated development of the Warrior Resiliency Course, a psychology based educational instruction that empowers Warfighters to take control of their stress reaction and increase unit readiness by addressing existing Post-Traumatic Stress Disorder (PTSD) in the unit, the potential to develop PTSD and family member education. This project will continue in FY 2015 in partnership with OSD (Policy) and the National Institutes of Health. •Extreme Bandwidth Analyzer and Correlator (EBAC): The EBAC technology senses broadband radio frequency (RF) information from the environment and outputs high resolution wideband spectrum information. In FY 2014, in conjunction with the Air Force, system development improved the accuracy and speed of the signal analysis, post processing and direction finding capabilities. ECTD funding for this effort completed in FY2014. The improvements will be demonstrated in an open air capability during an Electromagnetic Spectrum experimentation event in FY 2015. •Map Based Planning Service (MBPS): This project developed a set of services and capabilities that allow planners, staff and leaders to collect, process, store, display and share data and information in a geo-temporal context in order to develop situational awareness, share knowledge and make informed decisions in a near real-time environment. An operational prototype was deployed in FY 2014. The effort will fully transition to the Army Engineer Research and Development Center (ERDC) in FY 2015. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> •Spectral Management: The Spectral Management project will complete Generation II development and perform testing. Testing will take place in applicable global environments and involve the currently fielded camouflage spectrum as a baseline. Results 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>will be used to finalize the Spectral Management camouflage specification in support of Marine Corps Systems Command and the Army Program Executive Officer (PEO) Soldier.</p> <ul style="list-style-type: none"> •Spatial Iris: The Spatial Iris project will continue in FY 2015 developing and fielding software that enables manual and digital mobile data collection of geospatial intelligence in austere environments by DoD, interagency organizations and host nation partners. The software enables persistent domain awareness to combat transnational criminal organizations, counterinsurgency, Humanitarian Assistance/Disaster Relief, civil affairs, or otherwise monitor 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: The Humanitarian Assistance/Disaster Relief (HA/DR) Science & Technology Test Center established partnerships and identified a location for an ongoing capability for evaluating expeditionary and HA/DR technologies in a Southeast Asian tropical environment. The Test Center will be completed in FY 2015 and support U.S. Pacific Command (PACOM) HA/DR Science & Technology (S&T) exercises and demonstrations. •Spar Tactical Sensor Mast: The Spar Tactical Sensor Mast project will continue in FY 2015, with the planned delivery of the Spar ocean sensor buoy, integration of sensor systems by Naval Surface Warfare Center Dahlgren and deployment during Trident Spectre and potentially in the U.S. Southern Command (USSOUTHCOM) area of responsibility. •Two classified Maritime Disablement Operations prototypes will deliver and demonstrate prototype capabilities in FY 2015. •Warrior Resiliency Course: The Warrior Resiliency Course, a psychology based educational instruction that empowers Warfighters to take control of their stress reaction and increase unit readiness will deliver a Train-the-Trainer program to selected unit members, first responders, and medical professionals; provide mentored resiliency training to military members (training by Unit Trainers); and complete a Web portal for the Department of Defense focused on Recoding Post-Traumatic Stress Disorder (PTSD). •Electric-Vertical BAT (E-VBAT): The E-VBAT Unmanned Aircraft System (UAS) will perform maritime launch and recovery demonstrations from Stiletto in FY 2015 specifically 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. •ARCO: The system provides a heads-up display (HUD) that delivers day/night-time vision, thermal imaging, navigation and route planning capabilities. The ARCO project will complete all development, integration and testing in FY 2015. The prototypes will be demonstrated during a Limited User Assessment in March 2015 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 will inform follow-on Joint Special Operations Command (JSOC) science & technology development and acquisition. 			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>•Additional FY 2015 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 for Research (ASD(R&E)) and Engineering and the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping (DASD(EC&P)).</p> <p>FY 2016 Plans: 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 ASD(R&E) and DASD(EC&P).</p>				
<p>Title: Proof of Principle Prototyping</p> <p>Description: This project focuses on cost-effective, limited duration efforts to design, develop and deliver prototypes of cutting-edge land, sea, 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 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. 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 surprise, preserve industrial base capabilities, impose asymmetric strategic costs on potential adversaries, and explore innovative, technology-enabled military capabilities.</p> <p>FY 2014 Accomplishments: In FY 2014, Rapid Prototyping addressed the areas of Electromagnetic Spectrum Agility; Multi-Domain Autonomous Systems; Counter-Weapons of Mass Destruction; and Dismounted Soldier Systems. Plans include pursuing development of concepts and designs that will result in ready-to-field prototype systems in one to three years.</p>		4.308	-	-
<p>Title: Electromagnetic Spectrum Agile Capability Focus Area</p> <p>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. Rapid advancement of technologies and tactics that erode the U.S. ability to operate freely in the electromagnetic spectrum are affecting operational performance. Prototypes from this focus area will be delivered to joint and Service users to evaluate operational capabilities under realistic conditions and against current adversaries or anticipated electromagnetic threats. Potential venues for prototype assessment include assets such as the Stiletto Maritime Demonstration Program, Thunderstorm integration exercises and the Joint Experimental Range Complex (JERC) in Yuma, Arizona. Knowledge and experience gained through</p>		-	5.188	6.750

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2015 Plans: Plans for FY 2015 include pursuing development of concepts and designs that will result in innovative Concepts of Operations (CONOPS) and prototype systems in one to three years. While project determinations are generally made in the year of execution, projects to be considered will explore capabilities that amplify electromagnetic signals of interest or protect the freedom of operations in the electromagnetic spectrum by DoD and its partners. Two to three prototype efforts are anticipated in FY 2015 leveraging joint, Service and interagency partnerships.</p> <p>FY 2016 Plans: FY 2016 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.</p>			
<p>Title: Multi-domain Autonomous Systems Focus Area</p> <p>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 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 Aircraft Systems, Unmanned Ground Combat Vehicles, Unmanned Underwater Vehicles, and Unmanned Surface Vessels. 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</p>	-	4.938	6.250

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2015 Plans: Plans for FY 2015 include pursuing development of concepts and designs that will result in innovative CONOPS 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. Two to three prototype efforts are anticipated in FY 2015 leveraging joint, Service, and interagency partnerships.</p> <p>FY 2016 Plans: FY 2016 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 autonomous threats.</p>				
<p>Title: Counter-Weapons of Mass Destruction Focus Area</p> <p>Description: This focus area for FY 2015 and FY 2016, 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 DoD's Strategy for Countering Weapons of Mass Destruction by developing and demonstrating active and passive defenses that address both known threats and potential surprises in adversaries' Weapons of Mass Destruction (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 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 the Joint Experimental Range Complex (JERC). 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.</p>		-	3.938	4.750

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015
<p>FY 2015 Plans: Plans for FY 2015 include pursuing development of concepts and designs that will result in innovative CONOPS and prototype systems in one to three years. While project determinations are generally made in the year of execution, projects to be considered prototypes and demonstrations of capabilities to detect early indications of activities leading to a terrorist or State-sponsored attack using Weapons of Mass Destruction. 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 2015 leveraging joint, Service, and interagency partnerships.</p> <p>FY 2016 Plans: FY 2016 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 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.</p>			
<p>Title: Dismounted Soldier Systems Focus Area</p> <p>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 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. 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.</p> <p>FY 2015 Plans: Plans for FY 2015 include pursuing development of concepts and designs that will result in innovative CONOPS 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,</p>		-	2.186
		3.000	

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
robotics, human performance optimization, warfighter resilience, command & control, mobility and sustainment. Potential projects include the development of expeditionary and man-portable capabilities that enhance situational awareness, communications, data to decisions and access to energy and power. Two to three prototype efforts are anticipated in FY 2015 leveraging joint, Service, and interagency partnerships. FY 2016 Plans: FY 2016 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.			
Accomplishments/Planned Programs Subtotals	33.535	33.658	33.515

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
In FY 2016, generic performance metrics applicable to Emerging Capabilities includes attainment of this objective is transition 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 and dates. In FY 2014, Emerging Capabilities Technology Development achieved a transition rate of approximately 70 percent.

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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P369: <i>Disruptive Technology Demonstrations</i>	-	19.000	-	-	-	-	-	-	-	-	Continuing	Continuing

Note
In FY 2015, Disruptive Demonstrations (P369) funding was transferred from the ECTD Program Element to PE 0603289D8Z (Advanced Innovative Analysis and Concepts).

A. Mission Description and Budget Item Justification

The Disruptive Technology Demonstrations project is a technology initiative to address pre-conflict-centric capability needs and anticipatory concerns while maintaining low cost, small footprint operations. The program objectives are to develop disruptive anticipatory products, processes and services suited for quick deployment to fulfill emerging pre-conflict requirements. Disruptive technology and process demonstrations will leverage low cost, commercial, and often low-technology options to provide game-changing and innovative warfighting capabilities. Demonstrations will include protection capabilities in an era of increased theft of Defense-related Intellectual Property (IP).

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Disruptive Technology Demonstrations	FY 2014	FY 2015	FY 2016
<p>Description: The Disruptive Technology Demonstrations project is a technology initiative to address pre-conflict-centric capability needs and anticipatory concerns while maintaining low cost, small footprint operations. Prior fiscal year accomplishments include:</p> <ul style="list-style-type: none"> - Identified alternative, game-changing capabilities leveraging existing Department of Defense Capabilities in partnership with United States Pacific Command. - Analyzed, demonstrated, and transitioned innovative alternative uses of existing Service programs of record. - Built threat models at an all-source level to address an urgent Combatant Command (COCOM) requirement. - Evaluated four near-term, game-changing options to address an urgent COCOM requirement. - Evaluated cost-effective forward base defense architectures. <p>Due to nature of these efforts, specific descriptions and detailed plans are available at higher classification levels.</p> <p>FY 2014 Accomplishments: Disruptive Technology Demonstrations focused on addressing anticipatory concerns, and small footprint, low-cost operations. This was accomplished by utilizing low cost, commercial and existing Programs of Record, along with low technology options outside the typical DoD acquisition business model. Specific FY 2014 accomplishments are as follows: Designed and procured equipment to build a prototype configuration of an Intelligence, Surveillance and Reconnaissance-denial project. Prepared mission-level analysis with John Hopkins University Applied Physics Lab and Massachusetts Institute of Technology Lincoln Labs</p>	19.000	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603699D8Z / <i>Emerging Capabilities Technology Development</i>	Project (Number/Name) P369 / <i>Disruptive Technology Demonstrations</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
that was used in a Pacific Command-sponsored Operational Exchange meeting with various services, JS and the Intelligence Community, whose participation helped to refine and enhance the prototype design, to meet warfighters needs. Conducted experiments to refine and validate models for a unique concept for alternative navigation system with Sandia National Lab. Conducted systems engineering and conceptual design reviews for a prototype system using an existing operational platform. Due to nature of these efforts, specific descriptions and detailed plans are available at higher classification levels.			
Accomplishments/Planned Programs Subtotals	19.000	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The primary acquisition strategy for funding Disruptive Technology Demonstrations will be through the use of Military Inter-Departmental Purchase Requests (MIPRS). The specifics of each MIPR will be dependent upon the development center, laboratory, contractor or agency requirements and needs. If an Inter-Agency agreement is required, compliance and coordination of the agreement will be completed in coordination with the receiving activity and Federal Acquisition Regulation 17.5.

E. Performance Metrics

FY 2016 performance Metrics for Disruptive Demonstrations will be displayed in PE 0603289D8Z (Advanced Innovative Analysis and Concepts).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	122.841	60.651	57.714	65.836	-	65.836	69.905	74.772	80.806	81.925	Continuing	Continuing
P470: Strategic Environmental Research and Development Program (SERDP)	122.841	60.651	57.714	65.836	-	65.836	69.905	74.772	80.806	81.925	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	62.324	57.796	68.287	-	68.287
Current President's Budget	60.651	57.714	65.836	-	65.836
Total Adjustments	-1.673	-0.082	-2.451	-	-2.451
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-0.082			
• SBIR/STTR Transfer	-1.673	-			
• Baseline Program Adjustments	-	-	-2.451	-	-2.451

Change Summary Explanation

The revised funding levels for FY 2016 are due to the need to address high priority programs within AT&L as determined by senior leadership.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603716D8Z / <i>Strategic Environmental Research and Development Program (SERDP)</i>				Project (Number/Name) P470 / <i>Strategic Environmental Research and Development Program (SERDP)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P470: <i>Strategic Environmental Research and Development Program (SERDP)</i>	122.841	60.651	57.714	65.836	-	65.836	69.905	74.772	80.806	81.925	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)

Title: Environmental Restoration	FY 2014	FY 2015	FY 2016
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.	14.633	14.346	16.806
FY 2014 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. Specific Statements of Need were released and proposals were selected that will address improved remediation operation through fine scale delineation of contaminated subsurface environments, in situ remediation of perfluoroalkyl contaminated groundwater, and improved understanding of the impact of ongoing, low level contaminant influx to aquatic sediment site restoration. Details are available at www.serdp-estcp.org .			
FY 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603716D8Z / <i>Strategic Environmental Research and Development Program (SERDP)</i>	Project (Number/Name) P470 / <i>Strategic Environmental Research and Development Program (SERDP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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. A Statement of Need was released and proposals are being selected that will address improved understanding of long term natural attenuation processes on contaminants in groundwater. Details are available at www.serdp-estcp.org.</p> <p>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.</p>			
<p>Title: Munitions Response (MR)</p> <p>Description: Munitions Response (MR) develops detection, discrimination, 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.</p> <p>FY 2014 Accomplishments: Research initiatives focused on the highest priority DoD requirements in underwater UXO detection and discrimination, 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. Statements of Need were released and proposals were selected to address these issues. Details are available at www.serdp-estcp.org.</p> <p>FY 2015 Plans: New research initiatives will focus on the highest priority DoD requirements in underwater UXO detection and discrimination, advanced sensors, signal processing, supporting technologies, and protocols to reduce the costs associated with detecting and remediating UXO underwater. A Statement of Need was released and proposals are being selected that will address the detection, classification, and remediation of military munitions underwater. Details are available at www.serdp-estcp.org.</p> <p>FY 2016 Plans: New research initiatives will focus on the highest priority DoD requirements in underwater UXO detection and discrimination, advanced sensors, signal processing, supporting technologies, and protocols to reduce the costs associated with detecting and remediating UXO underwater.</p>	8.006	8.648	11.106
<p>Title: Resource Conservation and Climate Change (RC)</p> <p>Description: Resource Conservation and Climate Change (RC) develops the science and technologies required to sustain training and testing ranges.</p>	20.606	18.773	19.706

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603716D8Z / <i>Strategic Environmental Research and Development Program (SERDP)</i>	Project (Number/Name) P470 / <i>Strategic Environmental Research and Development Program (SERDP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i> 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 2010 QDR, including the assessment of climate change impacts to DoD installations. Specific Statements of Need were released and proposals were selected for funding to address these issues. Details are available at www.serdp-estcp.org.</p> <p><i>FY 2015 Plans:</i> 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 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.</p> <p><i>FY 2016 Plans:</i> 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.</p>			
<p><i>Title:</i> Weapons Systems and Platforms (WP)</p> <p><i>Description:</i> 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.</p> <p><i>FY 2014 Accomplishments:</i> 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 to address the development of environmentally Sustainable Gas Generators and Mono/Bi-Propellants, development of replacements for polyimide composite materials containing methylene dianiline (MDA). Details are available at www.serdp-estcp.org.</p> <p><i>FY 2015 Plans:</i> 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</p>	17.406	15.947	18.218

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603716D8Z / <i>Strategic Environmental Research and Development Program (SERDP)</i>	Project (Number/Name) P470 / <i>Strategic Environmental Research and Development Program (SERDP)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
are being selected for funding to address sustainable gasless delay formulations and standardized test methodologies for low observable coating durability. Details are available at www.serdp-estcp.org .			
<i>FY 2016 Plans:</i> 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	60.651	57.714	65.836

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603727D8Z I <i>Joint Warfighting Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	17.611	3.325	5.396	9.626	-	9.626	7.936	8.425	9.107	9.230	Continuing	Continuing
<i>P727: Joint Warfighting</i>	17.611	3.325	5.396	9.626	-	9.626	7.936	8.425	9.107	9.230	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 analyses 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. 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 alternative 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603727D8Z I <i>Joint Warfighting Program</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	3.425	7.405	7.683	-	7.683
Current President's Budget	3.325	5.396	9.626	-	9.626
Total Adjustments	-0.100	-2.009	1.943	-	1.943
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.009			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.100	-			
• Baseline Adjustments	-	-	1.943	-	1.943

Change Summary Explanation

FY 2016 baseline adjustments to support emergent priorities in the Department.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P727: Joint Warfighting</i>	17.611	3.325	5.396	9.626	-	9.626	7.936	8.425	9.107	9.230	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 analyses 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. 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 alternative 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Support for Joint Capability Analysis	2.469	3.238	5.776

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>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 support 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> -Completed an initial identification and technical review and analyses of on-going Service, Defense Agency, OSD, and Combatant Command (CCMD) re-use efforts, equipment data sources, files, and formats. -Identified the taxonomy and developed and coordinated the draft list of capability drivers for candidate re-use equipment, including technical, and cost factors to use to measure outputs and capability success metrics. -Completed the baseline system definition and Project Plan for a DOD Intelligence, Surveillance, and Reconnaissance (ISR) Pilot Proof of Principle construct and test bed platform in conjunction with the Air Force ISR Agency in San Antonio, TX. -Supported initiatives to improve coordination of DoD Intelligence, Requirements and Acquisition domains. Refined concept which will serve as a joint marketplace for coordination between Intelligence, Requirements and Acquisition enterprises by enabling intelligence tailored and efficient intelligence product support for acquisition Programs of Record. - Funded senior military mentors and contractor analytic support for detailed technical portfolio assessments of projected adversary capabilities. -Developed a Service Level Agreement concept that provides a mechanism for the marketplace serving acquisition customers and the intelligence service providers to interact and agree on information needs and products. -Supported the system hardening, system enhancements, and made software bug fixes. Testing was completed in August and results were submitted to the Army. -The Integrated Cyber Ops project explored in phases several case studies across a range of potential problem areas to ensure robust Pacific Command (PACOM) cyber capabilities. Developed test case for Exercise ULCHI FOCUS GUARDIAN 2015; a preliminary engineering design for Pacific Command’s Supervisory Control and Data Acquisition (SCADA) experiment FY15; a draft Modeling & Simulation (M&S) plan for conducting realistic cyber training environment for PACOM Cyber Protection teams. <p>FY 2015 Plans:</p> <p>Continue emphasis on enhancing Mission Area Portfolio Assessments (MAPAs) to provide insights for future technology-based military capabilities serving the needs of joint warfighters. Provide direct analytical support responding to emergent joint military staffs to identify capability gaps and military needs for material solutions. Continue to support Joint 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</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>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. Continue work to finalize the Defense Asset Capability Re-Use Initiative (DECRI) system architecture and Project Plan for system build, and begin actual development and implementation of the DECRI decision support and information system. Update ISR module tables to additional Joint Capability Areas (JCAs), design DECRI interfaces and automated data feeds, and conduct detailed DECRI system and warfighter/Combatant Command (CCMD) user assessments. Plan and execute an analysis for Airborne Intelligence, Surveillance, and Reconnaissance (AISR) Transport Infrastructure. Several CCMDs, specifically SOCOM, CENTCOM, AFRICOM, and PACOM, have documented issues with how the current and projected AISR Transport Infrastructure falls short of meeting operational needs. The CBA will be developed in accordance with JCIDS processes through a working group led by AT&L, Joint Staff, and DoD Chief Information Office (CIO), and will include the Services, the CCMD, USD(I), and several agencies. Material gaps identified in the Capability Based Assessment (CBA) will be used to develop an Initial Capabilities Document (ICD) that could support an Analysis of Alternative (AoA) and subsequent program start.</p> <p>FY 2016 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 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.</p>			
<p>Title: Analytic Development of Joint Military Requirements Addressing Evolving Threats / Missions</p> <p>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. These resources leverage a small analytic framework (currently consisting of analysts at the Institute for Defense Analysis (IDA), and the Naval Postgraduate School (NPS)). 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.</p> <p>FY 2014 Accomplishments:</p>	0.856	2.158	3.850

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>-Conducted the Joint Interagency Field Experiment (JIFX) in partnership with the Naval Post Graduate School to enable Combatant Command staffs to better define capability requirements.</p> <p>-Conducted in JIFX three, week-long, field experiments focused on emerging technologies with over 120 individual experiments engaging more than 800 participants from industry, academia, Non-Government Organizations (NGOs), all services, 8 of 9 CCMDs and other government agencies to include Departments of Homeland Security (co-sponsor), State, Energy, Justice, Health and Human Services and Transportation.</p> <p>-Conducted in JIFX general technology assessments of all experiments and provided the results to CCMDs (and other federal entities upon request) in the form of published technical reports available on the JIFX website or from the Defense Technical Information Center. This information provides the CCMDs in the requirements process and limited objective experiments. Evaluation data for individual experiments was shared with the technology provider and early indications are that more than 75% of these organizations change their products based on this government feedback.</p> <p>-Conducted in JIFX detailed cyber and Radio Frequency (RF) vulnerability assessments of 23 emerging technologies providing thorough and realistic potential adversarial assessment of a single technologies and a system-of-systems early in the technology development cycle. This information was provided to CCMDs in the form of technical reports for use in requirements development and is available for acquisition decision-making. Early data suggests that more than 90% of these technology providers change their products based on this feedback.</p> <p>-Initiated development of a risk evaluation strategy for cyber effects to inform FY16 Platform Resilience and Mission Assurance analytical agenda.</p> <p>-Developed a cyber-vulnerability mitigation strategy typology that complements DoD's Risk Management Framework.</p> <p>-Examined mission priorities and criticality of systems (weapon systems and tactical communications systems) based on Department planning scenarios as a precursor for evaluating cyber resilience.</p> <p>-Initiated alignment of cyber effects to missions to determine potential risk, opportunities, impacts and implications as a precursor to inform cyber resilience roadmaps.</p> <p>-Completed a review of analytical approaches being used (or could be used) to identify key cyber terrain in both fielded weapon systems and systems at various stages in the acquisition process.</p> <p>FY 2015 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. The findings of these investigative analyses frequently explore joint capability development via experiments and prototype demonstrations leading toward potential material solutions. It will enable CCMDs to do experiments in the field that addresses regional capability gaps, explores potential solutions, and improves understanding of new technologies. As before, it</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603727D8Z / <i>Joint Warfighting Program</i>	Project (Number/Name) P727 / <i>Joint Warfighting</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
will empower the joint staffs to employ rigorous analysis and experimentation methodologies in support of their specific mission assignments, to assess their own needs critically and to examine viable capability gap solutions.			
<i>FY 2016 Plans:</i> 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. The findings of these investigative analyses frequently explore joint capability development via experiments and prototype demonstrations leading toward potential material solutions. It will enable CCMDs to do experiments in the field that addresses regional capability gaps, explores potential solutions, and improves understanding of new technologies. As before, it will empower the joint staffs to employ rigorous analysis and experimentation methodologies in support of their specific mission assignments, to assess their own needs critically and to examine viable capability gap solutions.			
Accomplishments/Planned Programs Subtotals	3.325	5.396	9.626

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	18.167	15.754	15.202	-	15.202	15.181	15.653	16.132	16.351	Continuing	Continuing
P781: <i>Software Engineering Institute (SEI)</i>	-	13.148	15.754	15.202	-	15.202	15.181	15.653	16.132	16.351	Continuing	Continuing
P783: <i>Software Producibility Initiative</i>	-	5.019	-	-	-	-	-	-	-	-	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, and reliance on software-intensive mobile and net based products and systems has been increasing (for example (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 Department through Reliance 21, the overarching framework of the DoD's Science and Technology (S&T) joint planning and coordination process. This PE directly benefits these DoD S&T Communities of Interest (COI): Command, Control, Communications, Computers, and Intelligence (C4I); Autonomy; Cyber; and Engineered Resilient Systems. Additionally, this PE benefits every COI to some degree due to the ubiquitous nature of software. 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 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.

Private sector investment has created rapid advances in information technologies, but the pace of transition to DoD applications is often very slow or the commercial applications do not meet DoD unique needs, e.g., high assurance software or large-scale integrated systems. The DoD needs to create opportunities to discover emerging technologies, to evaluate their potential to fit DoD needs, and where appropriate, conduct critical tests of the technologies under DoD conditions. The

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>
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Software Producibility Initiative, project P783, works across the Services, industry, and academia to research and transition software science and tools that address the capacity to design, produce, assure, and evolve software-intensive systems in a predictable manner while effectively managing risk, cost, schedule, quality, and complexity.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	19.006	15.776	15.778	-	15.778
Current President's Budget	18.167	15.754	15.202	-	15.202
Total Adjustments	-0.839	-0.022	-0.576	-	-0.576
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.223	-			
• SBIR/STTR Transfer	-0.616	-			
• FFRDC Sec 8104	-	-0.022	-	-	-
• Economic Assumptions	-	-	-0.043	-	-0.043
• Realignment for Higher Priority Programs	-	-	-0.533	-	-0.533

Change Summary Explanation

Funding decreases were used to pay for higher priority DoD bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>				Project (Number/Name) P781 / <i>Software Engineering Institute (SEI)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P781: Software Engineering Institute (SEI)</i>	-	13.148	15.754	15.202	-	15.202	15.181	15.653	16.132	16.351	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Software Engineering Institute (SEI) Federally Funded Research and Development Center (FFRDC) was established in 1984 as an integral part of the Department of Defense's (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 Defense Industrial Base and academia cannot as readily address challenges. The mission of the SEI is to provide DoD with technical leadership and innovation through research and development to advance the practice of software engineering and technology. The Institute 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 2014	FY 2015	FY 2016
Title: Software Engineering Institute (SEI) Research	13.148	15.754	15.202
Description: SEI research projects are awarded on a competitive basis across the SEI. The number of projects 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 research initiatives and explore new technical ideas. SEI research focuses on the most significant and pervasive software challenges within the DoD such as computing for real-time and embedded-systems, multi-core programming, computing at the tactical edge, System of System architectures, discovering effective agile methods to develop DoD-scale systems, cyber-security, and measurement-driven methods to improve the efficiency of acquisition programs.			
FY 2014 Accomplishments:			
<ul style="list-style-type: none"> • Developed a technique to enable proactive cost control for major systems, by determining the impact of design choices on the cost of testing. SEI blog post highly accessed in calendar year (CY) 2014: 166,000 hits. • Developed programming techniques for multicore platforms that increase speed and efficiency while guaranteeing real-time performance. Awarded Top Paper at the 20th Institute of Electrical and Electronics Engineers Real-Time and Embedded Technology and Applications Symposium. • Developed a method and tools to aid in assuring quality and affordability in the design of big data systems. Work tailored to and piloted on the Military Health System. • Using the CERT insider threat detection test bed, evaluated trends and developed guidance which substantially improves sustained protection against internal attacks. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>	Project (Number/Name) P781 / <i>Software Engineering Institute (SEI)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Transitioned research in vulnerability discovery, for both dynamic and static analysis, resulting in software applications that are hardened and more secure, before and after they are deployed into the DoD infrastructure, including a Major Defense Acquisition Program. • Automated the detection of malicious network traffic to identify indicators that expedite detection and response. • Prototyped algorithms that will allow DoD to take advantage of computer network modeling and analysis for insider threat and advanced persistent threat faster and at less cost. Technology transferred to multiple DoD entities and U.S. Government independent establishments. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Increase the library of algorithms that allow DoD to better utilize computer network modeling and analysis, social network analysis, and command and control decisions. • Pilot and evaluate technologies and methods to assess individual and team performance during exercises for cyber mission teams. • Prototype software systems for detecting enterprise-wide insider threats. • Research disruptive technologies, such as dynamic collaborative human-computer decision systems, insider threat mitigation, and automated vulnerability discovery in mobile platforms; providing new operational cybersecurity capabilities for the DoD. • Develop and pilot automated vulnerability discovery tools to assist in determining how to allocate resources towards unique, exploitable software faults, reducing system exposure and cost. • Test, validate and release guidelines that will enable DoD programs to successfully use Agile software development approaches. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Develop and pilot high performance, assured software components for the processing, exploitation, and dissemination of information from the tactical edge to the data center. Evolve programming and computation frameworks for 'big data' analysis, network protocols and architectures enabling access to data in disconnected, intermittent, low-bandwidth environments for better situational awareness and response. • Evolve model-based engineering of software-reliant systems and assurance evidence with support for automatic generation of secure code, virtual integration of subsystems and assessment of technical debt, automated code vulnerability discovery and synthesis of assurance cases. • Advance the state of the practice in electronic warfare and protection on coordinated and distributed network enabled systems, maturing and transitioning tools and techniques for software architectures and adaptive capabilities. • Enhance and deploy scalable and validated methods and software support for the training and development of the cyber and software engineering workforce. • Explore new lines of research. 			
Accomplishments/Planned Programs Subtotals	13.148	15.754	15.202

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>	Project (Number/Name) P781 / <i>Software Engineering Institute (SEI)</i>

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2014	FY 2015	FY 2016	FY 2016	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Cost To	
			Base	OCO	Total					Complete	Total Cost
• BA 2, PE # 0602751D8Z, P278: <i>Software Engineering Institute Applied Research</i>	10.699	9.143	8.824	-	8.824	8.961	9.471	10.262	10.401	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Transition of tools and practices for use in DoD programs of record and to the Defense Industrial Base, and 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 and 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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>				Project (Number/Name) P783 / <i>Software Producibility Initiative</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P783: Software Producibility Initiative</i>	-	5.019	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Shortcomings in software development often lead to schedule slippage, cost growth, and mission compromise. These shortcomings can frequently be traced to software development technologies which are not capable of addressing the scale and complexity of the software needed in today's systems. The Software Producibility Initiative seeks to conduct an integrated program of research from applied research through demonstration and evaluation to advance the state-of-the-art in the producibility of software for DoD systems, particularly those systems characterized by high complexity, need for robustness, information assurance, real-time performance, and physical distribution. The Initiative maintains a portfolio of work relevant to the Warfighter and DoD needs by periodically evaluating technology development efforts, retiring those that are under performing, and starting new efforts based on risk-reward priority. The Initiative demonstrates new underlying software technology and tools in various domains, e.g., Networks, Modeling and Simulation, Avionics, Signals Intelligence, where DoD can benefit and enhance the transition paths for the underlying technology.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Software Producibility Initiative	5.019	-	-
<p>Description: The Software Producibility Initiative seeks to improve the Department of Defense's (DoD's) ability to design, build, test, and sustain software-intensive systems which meet mission critical requirements, exhibit predictable behavior, and enable evolution and interoperability. Technology thrust areas include specification of complex requirements; "correct-by-construction" software development; scalable composition; high-confidence software and middleware; system architectures for network-centric environments; technologies for system visualization, testing, verification, and validation; model-driven development approaches; timing techniques for real-time embedded-systems; static and run-time analysis of software; design tools and development environments; and secure and efficient coding practices. Major collaborators and performers include the U.S. Army Aviation and Missile Research Development and Engineering Center (AMRDEC) and the Air Force Research Laboratory (AFRL), as well as academia and industry.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Explored model-based design and the use of formal mathematics and logic to build systems that behave as intended, and only as intended. • Using model-driven development, demonstrated the value of early discovery of potential system integration issues on the AMRDEC Joint Multi-role Rotorcraft technology demonstration program. • Developed a programming language and run-time system (open source) that enables high-level language support for exposing and managing node failure in high performance computing systems and commodity clusters. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>	Project (Number/Name) P783 / <i>Software Producibility Initiative</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Established guidance on techniques and principles for design-time and run-time tools that anticipate change and exhibit resilience. Demonstrated and tested a software tool suite that verifies early design through automatically-generated, mathematically-verifiable requirements statements. Developed tools to reduce software bloat and speed up execution time in C, C++, and other-languages. Began transition of tools to customers within the Naval Research Laboratory. Wrote a Software Development fact book and analyzed software engineering acquisition data to determine Return on Investment. Completed development of a technology roadmap that identifies critical capability thresholds to improve software producibility and an intellectual property strategy guide and template. Established a modeling environment for the design of safety-critical applications with better safety guarantees. Technology transferred through a course developed and delivered at Virginia Polytechnic Institute. Developed, up to run-time implementation, a model for composing parallel applications in a heterogeneous multicore environment that would allow applications to be ported more easily to different computers. Continued work to speed the transition of software research and development that increases the affordability of acquisition programs in accordance with the DoD's Better Buying Power initiative. Identified which techniques supporting model-based design of complex, heterogeneous, software intensive systems are sufficiently mature for transition into industrial practice, which require further research investment, and which should be abandoned. Successfully concluded the Software Producibility Initiative by transitioning technologies where able and completing plans in remaining execution years. 			
Accomplishments/Planned Programs Subtotals	5.019	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Number of tools developed which enable the specification of interface formalisms, the definition of component interfaces, and the checking of correct composition.
- Demonstrable reduction in the number of vulnerabilities and errors detected in software code of large software systems.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603781D8Z / <i>Software Engineering Institute (SEI)</i>	Project (Number/Name) P783 / <i>Software Producibility Initiative</i>
<ul style="list-style-type: none">• Number of transitions of promising systems and software engineering technologies to the DoD and Defense Industrial Base, and successful adoption of technologies by early adopter partners.• Observed improvements in cost, schedule, and performance via advances in the producibility of software for complex DoD systems and the productivity of software developers.• Number of multiple, active collaborations achieved between Software Producibility performers and the broader software engineering research community.• Number of coordinated and joint-Service activities across research efforts.		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	132.975	69.508	59.235	90.500	-	90.500	76.441	82.971	86.943	95.002	Continuing	Continuing
P826: <i>Quick Reaction Fund</i>	38.068	24.752	18.530	28.939	-	28.939	24.241	26.405	27.717	30.390	Continuing	Continuing
P828: <i>Rapid Reaction Fund</i>	89.419	41.210	37.060	57.879	-	57.879	48.482	52.811	55.433	60.781	Continuing	Continuing
P831: <i>Joint Rapid Acquisition Cell Support</i>	3.318	1.541	1.604	1.620	-	1.620	1.636	1.652	1.669	1.686	Continuing	Continuing
P833: <i>Strategic Multi-Layered Assessment (SMA) Support</i>	2.170	2.005	2.041	2.062	-	2.062	2.082	2.103	2.124	2.145	Continuing	Continuing

Note

The Quick Reaction Special Projects (QRSP) Program Element has been recast with a focus on producing risk-reducing prototypes designed to address priority Combatant Command (COCOM) threats. 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 among government laboratories, academia, and commercial research. The QRSP portfolio will develop technology that anticipates adversaries' capabilities through short-term, innovative science and engineering initiatives.

A. Mission Description and Budget Item Justification

The QRSP Program Element develops risk-reducing prototypes and conducts demonstrations designed to address immediate COCOM needs. QRSP efforts support the Department's goal to provide a hedge against technical uncertainty by supporting the development of 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 respond to emergent DoD issues and time-sensitive threats by selecting projects within the year of execution. These 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). Examples of the types of projects that are envisioned include: force protection projects to enhance anti-access and area denial capabilities, undersea offensive capabilities, and broad electronic warfare capabilities. The QRF initiates projects during the execution year and focuses on maturing technologies critically needed for the COCOMs. QRF projects are typically 12 months in duration and produce prototypes for demonstration and evaluation. The QRF consistently exceeds the transition objective of 40 percent for demonstration programs (DoD Strategic Objective 3.5.2D).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>
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The RRF program objectives, executed by the RRTO, are to develop 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 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	68.524	69.319	91.825	-	91.825
Current President's Budget	69.508	59.235	90.500	-	90.500
Total Adjustments	0.984	-10.084	-1.325	-	-1.325
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-10.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.967	-			
• SBIR/STTR Transfer	-1.983	-			
• Realignment for Higher Priority Programs	-	-	-1.097	-	-1.097
• FFRDC Adjustments	-	-0.084	-	-	-
• Economic Assumptions	-	-	-0.228	-	-0.228

Change Summary Explanation

The increase in funding from FY 2015 to FY 2016 reflects additional funding for prototyping to support the Defense Innovation Initiative (DII). FY 2016 funding decreases were used to pay for higher priority DoD Bills.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>				Project (Number/Name) P826 / <i>Quick Reaction Fund</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P826: Quick Reaction Fund</i>	38.068	24.752	18.530	28.939	-	28.939	24.241	26.405	27.717	30.390	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 field-test promising new proof of principle prototypes that can have immediate impact on military operations. QRF initiatives are limited to those that will 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; operational field demonstrations; unmanned and robotics systems; counter weapons of mass destruction capabilities; and counter-electronic warfare technologies.

In FY 2015 and FY 2016, 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Morning Express	2.354	-	-
Description: This project provides countermeasures to electronic systems to protect forces and infrastructure from attack. Target systems use electronic components, against which countermeasures were developed. Details are classified.			
FY 2014 Accomplishments:			
The project developed and evaluated a prototype system against a threat emulator. The program will transition through the Services and the Joint Air-Sea Battle Office as the lead operational advocate in FY 2015.			
Title: Steel Tiger	3.329	-	-
Description: The Steel Tiger project developed algorithms that were incorporated into a commercial radar system. The resulting capability fulfills a COCOM urgent need. Details are classified.			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<i>FY 2014 Accomplishments:</i> The project completed enhancements of a prototype system and executed two technical and one operational demonstration. The system will be deployed to a host site in FY 2015 for further operational evaluation. The QRF funding for this effort completed in FY 2014.				
<i>Title:</i> Square Dance Collaboration on SENTIENT-R <i>Description:</i> Data transfer between different secure networks is challenging and time consuming. This effort created a single integrated Maritime Domain Awareness (MDA) environment to provide operational users access to MDA sensitive compartmented information (SCI) data. The project establishes a basis for improved U.S. and Commonwealth nations' research and development and future intelligence, surveillance, and reconnaissance (ISR) interoperability.		1.759	-	-
<i>FY 2014 Accomplishments:</i> Two sets of hardware and software to support the capability were developed and prepared for transition to the Office of Naval Intelligence (ONI). Hardware and software developed in FY 2014 will be delivered to the ONI to support operations in mid-FY 2015.				
<i>Title:</i> U.S. and Australian Enclave Moving Target Cyber Collaboration Experiment <i>Description:</i> This project developed a network protect and defend capability demonstrating enclave resiliency during cyber events. The project conducted experiments to prove the capability will operate through cyber-attack events in U.S. and Australian Defense Department enclaves.		2.754	-	-
<i>FY 2014 Accomplishments:</i> This project demonstrated approaches to achieve a level of seamless, automated cyber operations support and shared cyber situational awareness, leveraging moving target technologies. The capability will transition to the Automated Digital Network System Program Office in FY 2015.				
<i>Title:</i> Dark Storm <i>Description:</i> The program provides advanced Space Situational Awareness (SSA) collection capabilities. Details are classified.		1.659	-	-
<i>FY 2014 Accomplishments:</i> The project developed a multi-camera system and demonstrated the ability to deliver improved timeliness information to the user community. The capability transitioned to an operational user. No further Quick Reaction Fund funding is planned for Dark Storm.				
<i>Title:</i> Anti-Personnel Landmine Alternative Integration Experiment		1.791	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Description: This project demonstrates that prediction, identification, geo-location, and responses to opposing force movements can be made more quickly and effectively with the use of an integrated Intelligence, Surveillance, and Reconnaissance (ISR), and kinetic fires capabilities. The project provides enhanced battlespace awareness and improved force application capabilities to direct and concentrate fires on opposing forces. It measures efficacy and latencies associated with detection, identification, and targeting of opposing forces in areas up to 17 kilometers from the control center.</p> <p>FY 2014 Accomplishments: The Anti-Personnel Landmine Alternative Integration Experiment demonstrated lower latencies for detection, identification and targeting; higher probabilities of opposing force detection and identification; and more rapid and accurate targeting of opposing forces when compared to current capabilities. The project informs anti-personnel landmine alternative modeling, development, and acquisition plans. Pre-experiment demonstrations were conducted in June 2014, at Fort Belvoir, Virginia. A full experiment was conducted in August 2014 at Yuma Proving Grounds, Arizona. The project may continue under the leadership and funding of Army Research Laboratory in FY 2015.</p>			
<p>Title: Pacific Pilot</p> <p>Description: 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, Navy, and Special Operations Forces' tactical communications.</p> <p>FY 2014 Accomplishments: The project developed and evaluated a prototype network system. Follow-on demonstrations will be executed in FY 2015 with future transition to Navy and Air Force program offices.</p>	2.729	-	-
<p>Title: Hardware/Software (HW/SW) Assurance and Integrity Analysis</p> <p>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 the state of practice and DoD capability to identify and mitigate HW/SW vulnerabilities through techniques and tools, and creation of needed new HW/SW assurance technology. This project provides research and development focus to advance capabilities that can be made available to current and future programs in acquisition, operational systems and legacy systems, and infrastructure.</p> <p>This Quick Reaction Fund (QRF) effort directly supports the 2014 National Defense Authorization Act (NDAA) Section 937 and adds to current Department work implementing requirements in NDAA 2013 Section 933. 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 assess and</p>	8.377	3.000	4.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>prioritize critical mission vulnerabilities to malicious software, supply chain exploit, and related cyber vulnerabilities, prioritize the use of best practice in Hardware/Software (HW/SW) vulnerability assessment, tested tools, proven processes, then promulgate findings and know-how.</p> <p>FY 2014 Accomplishments: Leveraged and augmented resources in the Services and National Security Agency to develop and deploy HW/SW tools, evaluation techniques, and best practices to support HW/SW assurance throughout the lifecycle. Identified available tools, recommended implementation guidance, and support capabilities. Identified gaps and addressed with plans and development activities. Defined a federated approach to ensure HW/SW security and support to capability development, acquisition, and sustainment activities. Identified Service and agency expertise and capabilities and developed an overarching framework to enable cross DoD coordination, oversight, and prioritization. Coordinated risk-based process aimed at efficient development and deployment of assurance and mitigation facilities and capabilities.</p> <p>FY 2015 Plans: Continue development, assessment, recommendation, and promulgation of software test tools and techniques. Continue maturation of federated approach to ensuring HW/SW tools, techniques, expertise, and support to acquisition and sustainment programs. Continue gap identification, assessment, and prioritization. Continue maturation of cross-DoD Concept of Operations (CONOPS) in delivery of HW/SW assurance services to programs. Initiate planning, fact-finding, and cross-Service coordination for software and hardware assurance enterprise license needs.</p> <p>FY 2016 Plans: Continue development, assessment, recommendation, and promulgation of software test tools and techniques. Continue maturation of federated approach to ensuring HW/SW tools, techniques, expertise, and support to acquisition and sustainment programs. Continue gap identification, assessment, and prioritization. Continue maturation of cross-DoD CONOPS in delivery of HW/SW assurance services to programs. Begin license acquisition, transitioning to centralized inventory and deployment, and operational management.</p>				
<p>Title: Anti-Access/Area Denial Focus Area</p> <p>Description: In FY 2015 and FY 2016, this 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 will ensure the QRF efforts are not duplicative with other work within DoD or with outside agencies and will seek to leverage such efforts.</p> <p>FY 2015 Plans:</p>		-	3.106	4.988

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Anti-access/area denial investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities, and new investments will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the 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 three prototypes in FY 2015.</p> <p>FY 2016 Plans: Anti-access/area denial investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities, and new investments will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the DoD, Federally Funded Research and Development Centers, other government agencies, industry, and academia will help identify areas critical to developing future anti-access/area denial technological enhancement efforts. Anticipate funding five prototypes in FY 2016.</p>				
<p>Title: Counter-Electronic Warfare Technologies Focus Area</p> <p>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 Rapid Reaction Technology Office will ensure the QRF efforts are not duplicative with other Counter-Electronic Warfare efforts and will seek to leverage other such efforts.</p> <p>FY 2015 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 projects in FY 2015.</p> <p>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 five projects in FY 2016.</p>		-	3.106	4.988
<p>Title: Counter-Weapons of Mass Destruction (CWMD) Focus Area</p> <p>Description: This focus area for FY 2015 and FY 2016, 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,</p>		-	3.106	4.987

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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 RRTO will ensure the QRF efforts are not duplicative with other CWMD efforts and will seek to leverage other such efforts.</p> <p>FY 2015 Plans: Investment decisions in CWMD during the budget year will respond to Department, COCOMs, Service, and other government organizations 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 two projects.</p> <p>FY 2016 Plans: Investment decisions in CWMD during the budget year will respond to Department, COCOMs, Service, and other government organizations 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 four projects.</p>				
<p>Title: Operational Field Demonstrations Focus Area</p> <p>Description: In anticipation of emerging needs, this focus area for FY 2015 and FY 2016 will include proof of principle and pre-Engineering and Manufacturing Development prototyping, and field demonstrations of technologies and fully integrated systems in direct response to critical operational needs and emerging threats. Emphasis will be on near term demonstration of the feasibility and military utility of integrated capability solutions that support conventional forces. Projects will transition to operational users within 12 months of initiation. The RRTO will ensure the QRF efforts are not duplicative with other Operational Field Demonstration efforts and will seek to leverage other such efforts.</p> <p>FY 2015 Plans: Operational Field Demonstrations investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities, and projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the other government agencies, industry, and academia will help identify areas critical to Operational Field Demonstrations efforts. Anticipate funding three projects.</p> <p>FY 2016 Plans: Operational Field Demonstrations investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities, and projects will be considered as new threats emerge or new opportunities are</p>		-	3.106	4.988

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
presented. Research and coordination with organizations throughout the DoD, FFRDCs, other government agencies, industry, and academia will help identify areas critical to Operational Field Demonstrations efforts. Anticipate funding four projects.			
<p>Title: Persistent Intelligence, Surveillance, and Reconnaissance (ISR) Focus Area</p> <p>Description: In anticipation of emerging needs, this focus area for FY 2015 and FY 2016, will include capabilities that improve ground, air, sea, and/or 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.</p> <p>FY 2015 Plans: Persistent ISR investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities and projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the other government agencies, industry, and academia will help identify areas critical to developing future capabilities. Anticipate funding three projects.</p> <p>FY 2016 Plans: Persistent ISR investment decisions during the budget year will respond to Department, COCOM, Service, and other government organization priorities and projects will be considered as new threats emerge or new opportunities are presented. Research and coordination with organizations throughout the other government agencies, industry, and academia will help identify areas critical to developing future capabilities. Anticipate funding five projects.</p>	-	3.106	4.988
Accomplishments/Planned Programs Subtotals	24.752	18.530	28.939

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
In FY 2016, performance metrics applicable to the Quick Reaction Fund (QRF) includes 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 project has a period of performance of approximately six to 18 months. All QRF projects are monitored for schedule

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deviation, transition outcome, reporting requirements, and deliverables such as test reports, components, and equipment. For projects that were completed in FY 2014, the QRF achieved a transition rate of approximately 80 percent.

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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P828: <i>Rapid Reaction Fund</i>	89.419	41.210	37.060	57.879	-	57.879	48.482	52.811	55.433	60.781	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 emerging threats; and, provides feedback to the S&T community to guide long term developmental strategies. With projects supporting each Department/Combatant Command (COCOM) priorities with a global perspective, RRTO anticipates adversaries' exploitation of technology, including available and emerging commercial capabilities. Prototypes delivered by RRTO provide cost effective capabilities to operational users faster than the typical acquisition cycle.

In prior years, RRTO has explored methods and approaches of 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 2016, 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 potential 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; interface of law enforcement and military operations; commercial product vulnerabilities and applications; biometrics and forensics science and technology; autonomous operations; data processing, exploitation and dissemination; cyber security; exploitation of new and emerging cell phone technologies; counter-proliferation initiatives; 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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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Title: Low Cost Innovative Projects (Projects Less Than One Million Dollars Each)</p> <p>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 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 to warfighters and interagency users.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Covert Unmanned Underwater Vehicle (UUV) Optical Communications Demonstration: Completed a Covert UUV Optical Communications Demonstration, which developed an optical modem to efficiently exfiltrate mission data without requiring physical recovery of the UUV; project deliverables transitioned to U.S. Navy 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; capability transitioned to U.S. Army Special Operations Command. • 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 capability of the Office of Naval Research's Large Diameter 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 U.S. Naval Explosive Ordnance Disposal (EOD) Technology Division. The capability transitioned to Joint EOD operators. • Collaborative Cross Domain Problem Solving: Completed and transitioned the Collaborative Cross Domain Problem Solving project allowing warfighters to collaborate securely with classified users, law enforcement, coalitional assets, and other government agencies without a large, dedicated collaboration system. • WiFi Geo-Location in Dense Co-Channel Environments: Completed the WiFi Geo-Location in Dense Co-Channel Environments project, which developed an airborne receiver system to accurately geo-locate WiFi devices in dense urban environments. Project deliverables transitioned to a U.S. Air Force Research Lab Rapid Innovation Fund program. • Topaz: Completed and transitioned 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 Commander, Submarine Forces. 	31.910	-	-

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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 fuel management device reduces fuel requirements by three to five percent. Project deliverables were transitioned to the U.S. Navy Expeditionary Combat Command and U.S. Marine Corps. • Green Flash: Completed and transitioned the Green Flash prototype providing a threat event countdown and notification application for smart phones. Details of this project are classified. • 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. • 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. • Operationalizing “Just Doesn’t Look Right.” Completed the Operationalizing “Just Doesn’t Look Right” 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. • Omni laser communications prototype: Completed and transitioned the Omni laser communications prototype, a system capable of: operating from battery power; supporting multiple concurrent links; operating in radio frequency jamming environments; and, automatically acquiring and tracking multiple sources. Details of this project are classified. • Fusion Acquisition to Support Targeting: Completed and transitioned the Fusion Acquisition to Support Targeting prototype to provide more accurate, real-time, and Size, Weight, and Power (SWAP)-efficient processing of Light Detection and Ranging (LiDAR) and Hyperspectral data to improve targeting capabilities for the warfighter. Project deliverables transitioned to the Naval Oceanographic Office as an upgrade to the Coastal Zone Mapping and Imaging LiDAR. • Social Network Aided Geo-Location: Completed and transitioned enhancements to the Social Network Aided Geo-Location program; details of this project are classified. • Distributed Full Motion Video (FMV) Exploitation prototype: Completed 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. • Controlling Cooperative Unmanned Aerial Vehicles (UAV) Using Brainwaves: Completed the Controlling Cooperative UAV Using Brainwaves project to develop and demonstrate core technologies to enable a warfighter to conduct simple military missions using UAVs controlled by brainwaves. • Counter Smuggling Weapons of Mass Destruction (WMD) Analysis, Training, and Technology (C-SWATT): Completed C-SWATT effort to provide national security forces in friendly/allied nations with the capability to detect and interdict Chemical, 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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.</p> <ul style="list-style-type: none"> • Tracking and Recognizing Disruptive Innovative Science: Completed the Tracking and Recognizing Disruptive Innovative Science project, which developed prototype software to identify countermeasures to our core military capabilities via open source data exploitation. • 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. • Event Notification System: Completed and transitioned the Event Notification System in support of U.S. Northern Command; details of this project are classified. • Fourth Option: Completed the Fourth Option project to develop a novel capability to track and trail threat vessels; 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 an application testbed. • Net Zero Engagement: The Net Zero Engagement project identified pilot locations in the U.S. Africa Command Area of Responsibility, 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 the emerging 3G/4G 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 effort transitioned to the end user in support of the warfighter. • 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 will allow a quantitative measure of current sensing, fusion, and analysis capabilities. Details of this project are classified. • Contingency Communications: Completed the Contingency Communications project which aimed to provide Special Operations Forces (SOF) with tools to both communicate and collect intelligence data as required in a post Afghanistan environment focused on "Special Warfare" while providing protection to the data associated with those transmissions. Transitioned to end user. • Future Infrared Search and Track Phase Two: Completed Future Infrared Search and Track (FIRST) Phase Two which followed the successful completion of the initial phase tasks for an advanced infrared search and track (IRST) sensor. Phase Two expands the effort to demonstrate a novel sensor design that can detect targets with high resolution over a wide field of view with few pixels. The project transitioned to DoD partners. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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 (SOCOM). Phase One consisted of technical discovery, testing, and documentation. The project will continue in FY 2015 with FY 2014 funding until the software and support services to be delivered to SOCOM in FY 2015. • Forward Firing Flare: Completed the Forward Firing Flare project which delivered two ALE-47 Chaff/Flare Buckets in the forward firing configuration for nonstandard aircraft. Transitioned products to U.S. Central Command (USCENTCOM). • Lithium-ion Battery State-of-Health Monitor: Completed Phase 1 of the Lithium-ion Battery (LiB) State-of-Health Monitor project, which aimed to create 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 will complete in FY 2015 using FY 2014 funds. • Laser Threat Detection and Defeat: Completed the Laser Threat Detection and Defeat (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 against U.S. Government personnel and facilities. The system will enable 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 the Technical Surveillance Counter Measures (TSCM) Operational Units for fielding and maintenance. • Pacific Pilot: Completed Pacific Pilot, which sought to develop a prototype and testing of component technologies to demonstrate a net-centric approach to bidirectional dissemination of C4ISR to find, track, and fix threats supporting tactical communication. The technology transitioned to Navy and Air Force end users. • Perseus III: Completed the Perseus III project, which aimed to enhance the understanding of the capabilities and limitations of inexpensive, homemade Unmanned Aerial Vehicles (UAVs) and how they may place DoD personnel, equipment and infrastructure at risk. 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. • Solid State Neutron Detector: Completed the Solid State Neutron Detector (SSND) project which leveraged the single solid state detector previously developed by 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 neutron detection, has been transitioned to end users. • Tactical-Human Powered Submarines (T-HPS): Completed the baseline testing of a previously developed T-HPS hull. The testing will develop/validate proposed, tactics, techniques, and procedures (TTP) for man-portable clandestine maritime insertion or operations of up to four hours with gear in international waters anywhere in the world. The hull forms were transitioned to United States Navy Special War Command and United States Naval Academy. 			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Visualization, Summarization, and Recommendation (VISR) for Audio/Visual Data: Completed Phase One of the VISR for Audio/Visual Data project, which sought to create 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. This project will be completed in FY 2015 with FY 2014 funds. 				
<p>Title: Calderaevent</p> <p>Description: Calderaevent is a novel approach to provide situational awareness by integrating commercially available hardware with government developed algorithms. Technologies leveraged by this effort include precise timing equipment, military-grade radio sets, and government developed algorithms. This capability will enable the warfighter to seamlessly operate from permissive to denied environments. Further details are classified.</p> <p>FY 2014 Accomplishments: Calderaevent prototypes were successfully demonstrated in the Trident Spectre and Gypsy India exercises in FY 2014. The system evaluation report was delivered to the sponsor and training manuals and user guides were delivered to the customer organization.</p>		1.500	-	-
<p>Title: Strategic Multi-Layered Assessment (SMA) Cell</p> <p>Description: The SMA Cell provides planning support to 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 RRTO.</p> <p>FY 2014 Accomplishments: The Drivers of Conflict and Convergence in the Asia-Pacific Region in the Next Five to 25 Years effort executed by SMA assessed stability in the broader East Asian region. Using a variety of methodologies and disciplinary approaches, the research teams for this project built a qualitative and quantitative framework for understanding the drivers of conflict and convergence in the Asia-Pacific region. Project teams used content analysis, historical comparison, expert elicitation, and quantitative modeling to identify key variables that influence conflict and cooperation, with particular attention to the U.S.-China relationship in context with other key actors. These analyses informed the development of a systems dynamic model and decision support tool. The overall objective of the suite of projects contained in this effort was to inform U.S. Pacific Command decision makers in the development of intermediate and long-term strategies to manage risk and engage opportunities in the Asia-Pacific region. In addition to the insights provided by each project team, the projects also informed a systems dynamic model and decision support</p>		2.000	2.000	2.000

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>tool for COCOMs. These assessments are intended to be combined with unclassified (e.g., academic, subject matter expert, etc.) input not generally found in U.S. government work.</p> <p>FY 2015 Plans: Based on the analytical methods, the framework development and systems dynamics models developed during the Drivers of Conflict and Convergences project, the U.S. Security Coordinator (USSC) for Israel and the Palestinian Authority has requested that the SMA cell conduct a Coordinator’s Mission Review. The goal is to evaluate strategic risks and identify knowledge gaps in order to provide an increased understanding of potential future security environments and their implications for Palestinian security sector reform. The SMA team will conduct a multi-disciplined review of USSC questions and provide to the USSC staff a series of insights and recommendations that will enable them to derive a rich contextual understanding of the socio-political, social-cultural, security, and economic dynamics of the region. The SMA cell will also 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 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.</p> <p>FY 2016 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 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.</p>				
<p>Title: Biometrics and Forensics Science and Technology Focus Area</p> <p>Description: The focus area for Biometrics and Forensics Science and Technology projects will field prototypes that address the technology gaps that limit our ability to quickly and accurately identify anonymous individuals who threaten our physical and virtual assets, overseas or in the Homeland. Additionally, the biometrics and forensics projects will collaborate with interagency partners to attribute enemy activity to a specific individual; and, will operationally evaluate and test biometrics and forensics systems and technologies. The 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. Projects for both portfolios are selected after coordination throughout the DoD and across other U.S. government departments and agencies to maximize collaborative investment and prevent redundant research. Deliverables are shared throughout the biometrics and forensics communities.</p> <p>FY 2014 Accomplishments:</p>		3.500	4.000	4.000

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>The Biometrics and Forensics Science and Technology Focus Area engaged with warfighters and commanders from across the COCOMs and Services to identify common technology gaps within the respective enterprises. In accordance with these requirements, the biometric portfolio developed improved fingerprint matching algorithms between two-dimensional, three-dimensional, and latent fingerprints; delivered a prototype facial recognition system for vehicle check points; conducted an evaluation of emerging contactless fingerprint collection systems; developed the first stage of a Biometrically Enabled Watch List (BEWL) Dissemination Management Server to improve speed and accuracy of Biometric Watchlists; developed a Next Generation Mobile Identification application for the iPhone; and, developed a multi-sensor process to remotely detect and monitor clandestine gravesites. The forensic portfolio developed several advancements for the exploitation of genetic material beginning with an expert deoxyribonucleic acid (DNA) interpretation software package to evaluate complex mixtures of DNA sources; a next generation system for human identification and physical trait characterization; a DNA sequence exploitation system for investigative genetics; and an ultra-rapid hand-held DNA system. After successful development and testing, three rapid DNA devices capable of generating human DNA identifications in 82 minutes were transitioned to U.S. Special Operations Command and the U.S. Army for operational use.</p> <p>FY 2015 Plans: The biometric portfolio will develop technologies to close gaps identified by commanders and operational users 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 testing evaluations and technology transfer of the BEWL Dissemination Management Server. The forensic portfolio will support development of capabilities 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 analysis that can be done in a field environment vice a laboratory environment. The forensic portfolio will manage the technology development efforts required to enable human identification and characterization capabilities and development of next generation genomic analysis technology. Additional 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.</p> <p>FY 2016 Plans: The biometric portfolio will continue to mitigate gaps identified by commanders and operational users 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 testing evaluations and technology transfer of the BEWL Dissemination Management Server. The forensic portfolio will mitigate gaps identified by commander's capabilities documents 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 analysis that can be done in a field environment vice a laboratory environment. The forensic portfolio will manage</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
the technology development efforts required to enable human identification and characterization capabilities and development of next generation genomic analysis technology. Additional 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.				
<p>Title: Faster Short Tandem Repeat (FaSTR) Human DNA Profiling System</p> <p>Description: FaSTR uses a different approach to achieve faster, inexpensive, 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 sub-30 minutes and provide a match probability of one in five million people.</p> <p>FY 2014 Accomplishments: Phase I focused on sub-system design of a microfluidic system that: (1) probes five Short Tandem Repeat (STR) loci (eventually six to nine), yielding a random match probability of one in five million, (2) demonstrated functionality of all major subsystems, including instrument, chemistry, and software control, (3) is small and easily ported and weighs < 30 pounds, (4) has simplified microfluidic architecture; and, finally, (5) exploits passive (not mechanical) valves to control fluid flow from “sample in” extraction through to electrophoresis.</p> <p>FY 2015 Plans: Phase II will integrate the subsystems and seek opportunities to probe additional STR loci. In addition, this phase will consist of testing and design modifications and optimizations to the initial prototypes delivered from Phase I. Test results will be reported back to project leaders for additional hardware and chemistry design modifications and optimizations.</p>		1.050	1.000	-
<p>Title: Innovation Outreach Program</p> <p>Description: The Innovation Outreach Program supports the Department of Defense Better Buying Power objectives by leveraging technology and emerging products developed by small, innovative businesses in the commercial sector. Solutions will be sought to meet needs identified by COCOMs, Military Service organizations, other Defense agencies, and interagency partners. The Innovation Outreach Focus Area 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. The Innovation Outreach Focus Area will include support of emerging capabilities in Communications, Data and Data Analysis, Alternative Energy, Imagery, Sensors, Social Networking, and other areas identified during the execution years.</p> <p>FY 2014 Accomplishments: In FY 2014, Innovation Outreach supported the Defense Prisoner of War/Missing Personnel Office, the U.S. Marine Corps' Amphibious Combat Vehicle and Improvised Explosive Detection offices, the U.S. Army's Dismounted Soldier Operational</p>		1.250	2.500	2.500

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Energy office, the U.S. Special Operations Command's Tactical Assault Light Operator Suit (TALOS) office, and the Office of the Secretary of Defense's Anti-Personnel Landmine effort.</p> <p>FY 2015 Plans: Rapid Reaction Fund (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. Innovation Outreach plans five engagements in FY 2015 including the Naval Warfare Systems Command, Department of State, and Department of Homeland Security.</p> <p>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. Innovation Outreach will plan five engagements with DoD users and interagency partners based on priorities identified in the execution year.</p>				
<p>Title: Open Source Data Analysis and Applications Focus Area</p> <p>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-Weapons of Mass Destruction and Counter-Improvised Explosive Device missions.</p> <p>FY 2015 Plans: The 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 four projects. Deliverables will include capabilities and tools to exploit open source information and to reduce manpower required to provide actionable intelligence.</p> <p>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. RRF will support development of open source data analysis tools and applications. The program anticipates supporting five to six projects. Deliverables will include capabilities and tools to exploit open source information and to reduce manpower required to provide actionable intelligence.</p>		-	3.937	7.054
<p>Title: Autonomous Systems and Behaviors Focus Area</p>		-	3.937	7.054

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>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, and support rapid customization of autonomous systems’ architectures.</p> <p>FY 2015 Plans: The 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 autonomous aerial, surface, and subsurface systems. Anticipate supporting four to five projects.</p> <p>FY 2016 Plans: The 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 autonomous aerial, surface, and subsurface systems. Anticipate supporting five to six projects.</p>				
<p>Title: Urban Characterization Focus Areas</p> <p>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.</p> <p>FY 2015 Plans: The 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 open source data analysis tools and applications. Anticipate supporting three to four projects. Deliverables will include modeling and simulations systems to support planning efforts.</p> <p>FY 2016 Plans: The 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</p>		-	3.938	7.055

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
development of open source data analysis tools and applications. Anticipate supporting five to six projects. Deliverables will include modeling and simulations systems to support planning efforts.				
Title: Intelligence, Surveillance, and Reconnaissance (ISR) Focus Area		-	3.937	7.054
<p>Description: ISR sensors span a wide range of sensing modalities and generally produce very large data sets that are difficult to analyze in a cluttered environment. 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; 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.</p> <p>FY 2015 Plans: The 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 and will prevent duplicative activities. Anticipate supporting three to four 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.</p> <p>FY 2016 Plans: The 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 five to six 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.</p>				
Title: Commercial Product Vulnerabilities and Applications Focus Area		-	3.937	7.054
<p>Description: Commercial Product Vulnerabilities and Applications projects explore the use of commercial-off-the-shelf products to address immediate operational needs. This focus area identifies and exploits technological advances made by industry that may have immediate military utility. These projects also explore the vulnerabilities of readily available technology used by adversaries. This focus area leverages investments made by the commercial sector to reduce cost for military equipment.</p>				

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2015 Plans:</i> The 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 to identify commercial product vulnerabilities and applications. Anticipate supporting five to six projects.</p> <p><i>FY 2016 Plans:</i> The 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 to identify commercial product vulnerabilities and applications. Anticipate supporting seven to eight projects.</p>			
<p><i>Title:</i> Interface of Military Operations with Law Enforcement and Border Patrol Focus Area</p> <p><i>Description:</i> Interface of Military Operations with Law Enforcement and Border Patrol new start projects include collaboration and exercises with law enforcement organizations to identify overlap and synergies between military and law enforcement operations, 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.</p> <p><i>FY 2015 Plans:</i> The 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 five to six projects.</p> <p><i>FY 2016 Plans:</i> The 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 six to seven projects.</p>	-	3.937	7.054
<p><i>Title:</i> Red Teaming in Support of Emerging Capabilities Focus Area</p> <p><i>Description:</i> Red Teaming projects assess the susceptibility of emerging capabilities defeat by parties not intimately familiar with the technology. The RRTO will leverage the innovative capabilities of 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.</p>	-	3.937	7.054

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2015 Plans:</i> The 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 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 Science, Technology, Engineering, and Math disciplines to explore unconventional approaches to counter DoD technologies, such as the Perseus unmanned underwater vehicle demonstration and Systems Engineering Research Center projects. Anticipate supporting four to five projects.</p> <p><i>FY 2016 Plans:</i> The 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 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 Science, Technology, Engineering, and Math disciplines to explore unconventional approaches to counter DoD technologies. Anticipate supporting five to six projects.</p>			
Accomplishments/Planned Programs Subtotals	41.210	37.060	57.879

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In FY 2016, performance metrics applicable to the Rapid Reaction Fund (RRF) includes 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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 3	PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>	P828 / <i>Rapid Reaction Fund</i>

completions and success 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 and dates. For projects completed in FY 2014, the RRF achieved a transition rate of approximately 80 percent.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>	Project (Number/Name) P831 / <i>Joint Rapid Acquisition Cell Support</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P831: <i>Joint Rapid Acquisition Cell Support</i>	3.318	1.541	1.604	1.620	-	1.620	1.636	1.652	1.669	1.686	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)

Title: Joint Rapid Acquisition Cell (JRAC) Management Support	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments: Initiated support for the JRAC to enable management and tracking of immediate COCOM warfighter requirements. Warfighter needs were validated by the Joint Staff.</p> <p>FY 2015 Plans: Continue support for the JRAC management and tracking of COCOM initiatives. Continue validation of the warfighter needs by the Joint Staff.</p> <p>FY 2016 Plans:</p>	1.541	1.604	1.620

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>	Project (Number/Name) P831 / <i>Joint Rapid Acquisition Cell Support</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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	1.541	1.604	1.620

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

NA – Capabilities acquired to fulfill Joint Urgent Operational Needs and Joint Emergent Operational Needs 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>	Project (Number/Name) P833 / <i>Strategic Multi-Layered Assessment (SMA) Support</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P833: <i>Strategic Multi-Layered Assessment (SMA) Support</i>	2.170	2.005	2.041	2.062	-	2.062	2.082	2.103	2.124	2.145	Continuing	Continuing

A. Mission Description and Budget Item Justification

The SMA Cell supports all Combatant Commands (COCOMs), Joint Force Commanders, and other government agencies by assessing complex operational/technical challenges, which require 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 for 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 2014	FY 2015	FY 2016
Title: Drivers of Conflict and Convergence in the Asia-Pacific Region in the Next Five to 25 Years	2.005	2.041	2.062
Description: The SMA Cell conducted an effort starting in FY 2014 at the request of U.S. Pacific Command (USPACOM) to provide an analytical capability to identify areas of strategic risk and opportunity in the Asia-Pacific region over the next two decades. Specifically, these analytical capabilities enabled USPACOM to examine future political, security, societal, and economic trends; identify where U.S. strategic interests are in cooperation or conflict with Asian and other interests worldwide, in particular, the East China Sea; and to leverage opportunities when dealing with Asian countries in a "global context."			
FY 2014 Accomplishments: The Drivers of Conflict and Convergence in the Asia-Pacific Region in the Next Five to 25 Years effort executed by SMA assessed stability in the broader region to include Asian countries and other key players in East Asia. Using a variety of methodologies and disciplinary approaches, the research teams for this project built a qualitative and quantitative framework for understanding the drivers of conflict and convergence in the Asia-Pacific region. Project teams used content analysis, historical comparison, expert elicitation, and quantitative modeling to identify key variables that influence conflict and cooperation. These analyses informed the development of a systems dynamic model and decision support tool. The overall objective of the suite of projects contained in this effort was to inform USPACOM decision makers in the development of intermediate and long-term strategies to manage risk and engage opportunities in the Asia-Pacific region. In addition to the insights provided by each project team, the projects also informed a systems dynamic model and decision support tool for COCOMs. These assessments are intended to be combined with unclassified (e.g., academic, subject matter expert, open source, etc.) input not generally found in U.S. government work.			
FY 2015 Plans: Based on the analytical methods the framework development and systems dynamics models developed during the Drivers of Conflict and Convergences project, the U.S. Security Coordinator (USSC) for Israel and the Palestinian Authority requested			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603826D8Z / <i>Quick Reactions Special Projects (QRSP)</i>	Project (Number/Name) P833 / <i>Strategic Multi-Layered Assessment (SMA) Support</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>that the SMA conduct a Coordinator’s Mission Review to evaluate strategic risks and identify knowledge gaps. They provide an increased understanding of potential future security environments and their implications for Palestinian security sector reform. The SMA team will conduct a multi-disciplined review of USSC questions and provide to the USSC staff a series of insights and recommendations that will enable them to derive a rich contextual understanding of the socio-political, social-cultural, security, and economic dynamics of the region. The cell will also 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 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.</p> <p>FY 2016 Plans: The cell will continue to actively work with the senior COCOMs 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.</p>			
Accomplishments/Planned Programs Subtotals	2.005	2.041	2.062

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603832D8Z I <i>DoD Modeling and Simulation Management Office</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	67.741	31.222	2.995	-	-	-	-	-	-	-	Continuing	Continuing
P476: <i>DoD Modeling and Simulation Management Office</i>	61.588	27.356	2.995	-	-	-	-	-	-	-	Continuing	Continuing
P477: <i>Effects Chain Analyses Cell</i>	6.153	3.866	-	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	34.338	3.000	-	-	-
Current President's Budget	31.222	2.995	-	-	-
Total Adjustments	-3.116	-0.005	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.012	-			
• SBIR/STTR Transfer	-1.104	-			
• FFRDC SEC 8104	-	-0.005	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P476: DoD Modeling and Simulation Management Office	61.588	27.356	2.995	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: DoD Modeling and Simulation Management Office (MSMO)	27.356	2.995	-
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.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603832D8Z / <i>DoD Modeling and Simulation Management Office</i>	Project (Number/Name) P476 / <i>DoD Modeling and Simulation Management Office</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i> In FY 2014, MSMO enhanced the effectiveness of M&S expenditures through development of new common capabilities in an enterprise fashion and through improving re-use and interoperability of individual M&S tools in the following areas:</p> <p>Development Activities, MSMO:</p> <ul style="list-style-type: none"> • Provided users with rapid discovery of classified Order of Battle data and the most advanced and enhanced terrain in the Rapid Data Generation program and transitioned ownership to Joint Staff J7. • Facilitated the identification of mission- and engagement-level weapon system models in spiral II development of the Integrated Threat Systems Modeling and Simulation and transitioned capability to Missile and Space Intelligence Center. • Supported the development of and transitioned Cyber Operations Research and Network Analysis to the Test Resource Management Center. <p>Sustainment Activities, MSMO:</p> <ul style="list-style-type: none"> • Re-architected the DoD Enterprise M&S catalog to improve functionality. <p>Management/Coordination Activities, MSMO:</p> <ul style="list-style-type: none"> • Served as the DoD Lead Standardization Activity for managing M&S standards. • Coordinated the use of the Environmental Data Cube Support System in DoD exercises and The Technical Cooperation Program (TTCP) experiments. <p><i>FY 2015 Plans:</i> In FY 2015, MSMO will focus 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 reflects 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.</p> <p>MSMO is structuring its FY 2015 efforts in four categories: policy and guidance, standards, technology, and collaboration, as follows:</p> <p>Policy and Guidance:</p> <ul style="list-style-type: none"> • Research and initiate updates of AT&L-promulgated M&S Issuances and technical guidance. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>Standards:</p> <ul style="list-style-type: none"> • Serve as the Lead Standardization Activity for M&S Standards and Methodologies, and lead and/or participate in relevant DoD and International standards activities. <p>Technology:</p> <ul style="list-style-type: none"> • Develop, enhance, and advocate the M&S enterprise suite of tools. • Chair M&S Community of Interest. <p>Collaboration:</p> <ul style="list-style-type: none"> • Represent the U.S. interests in Interagency, and International M&S activities, e.g.: <ul style="list-style-type: none"> – Chair TTCP Technical Panel Two (M&S). – Serve as the US Principal Voting Member for the NATO M&S Group (NMSG) and participate in NMSG task groups. 			
Accomplishments/Planned Programs Subtotals	27.356	2.995	-

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603832D8Z / DoD Modeling and Simulation Management Office				Project (Number/Name) P477 / Effects Chain Analyses Cell			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P477: Effects Chain Analyses Cell	6.153	3.866	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Anti-access/Area-denial (A2/AD) threat requires detailed modeling and simulation based analysis to support weapon system and operational capability development. This effort will focus on generating operational scenario and system analyses, identifying specific analytic limitations, developing the technical analysis plan, and implementing the plan. These analyses will be acquisition-centered net analyses of the end-to-end blue (US and Allies) capabilities compared to specific red (potential adversary) capabilities focused on identifying the most promising technologies for application to A2/AD problems. The analyses will address acquisition specific questions such as: can an existing system be leveraged and/or can a group of capabilities be combined in different ways to improve the overall effectiveness of US systems? This office works closely with the Joint Staff, the Military Departments, Combatant Commands, and other Government entities.

In FY 2015, this project will be moved to PE 0603289D8Z entitled "Advanced Innovative Analysis and Concepts."

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Effects Chain Analyses Cell	3.866	-	-
<p>Description: The A2/AD effects chain analysis effort develops and strengthens the specific analysis data, tools, and actual technical analyses supporting decisions on weapon system and operational capability development. The analyses will initially focus on PACOM and include STRATCOM, SOCOM, and CYBERCOM. Projects undertaken will be approved by the USD(AT&L).</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Continued concept analysis of near-term systems in alternate employment scenarios. • Performed detailed performance and effects analysis of promising concepts. • Continued development of an end-to-end engagement model complete with finer tuned detailed threat models. • Continued development of required adversary threat models to include a new class of threats Design, prototype and evaluate projectile configurations to determine optimal system performance for high priority threats. • Continued to perform in fine detail, trade studies on sensor types, sensor configurations, autopilot designs, guidance, midcourse and terminal guidance options. • Continued evaluation of left of launch options for countermeasures including modeling and integration of a new class of threats. • Continued evaluation of structured attack scenarios versus weapon laydown options. • Continued efforts to increase end-game accuracy. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603832D8Z / <i>DoD Modeling and Simulation Management Office</i>	Project (Number/Name) P477 / <i>Effects Chain Analyses Cell</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
• Continued to explore and expand sensor options to provide highest probability of kill against threats.			
Accomplishments/Planned Programs Subtotals	3.866	-	-

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603833D8Z I <i>Engineering Science and Technology (S&T)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	-	-	18.377	-	18.377	8.761	9.370	9.897	9.964	Continuing	Continuing
P401: <i>DoD Modeling and Simulation Management Office</i>	-	-	-	3.377	-	3.377	3.761	4.370	4.897	4.964	Continuing	Continuing
P402: <i>Systems Engineering Research Center</i>	-	-	-	5.000	-	5.000	5.000	5.000	5.000	5.000	Continuing	Continuing
P403: <i>Engineered Resilient Systems</i>	-	-	-	10.000	-	10.000	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

This new Program Element (PE) was created to better align the following efforts previously funded in other PE's: (1) the Modeling and Simulation Management Office project was transferred 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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>
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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	-	-	3.520	-	3.520
Current President's Budget	-	-	18.377	-	18.377
Total Adjustments	-	-	14.857	-	14.857
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment for Higher Priority Programs	-	-	14.881	-	14.881
• Economic Assumptions	-	-	-0.024	-	-0.024

Change Summary Explanation

\$10.000 million add in FY 2016 is for Engineering Resilient Systems to focus on mission-relevant trade-space analysis and cost reduction pre-milestone B.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>				Project (Number/Name) P401 / <i>DoD Modeling and Simulation Management Office</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P401: <i>DoD Modeling and Simulation Management Office</i>	-	-	-	3.377	-	3.377	3.761	4.370	4.897	4.964	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 2014	FY 2015	FY 2016
Title: DoD Modeling and Simulation Management Office (MSMO)	-	-	3.377
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.			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2016 Plans:</i> 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.</p> <p>Policy and Guidance: • Issue updated AT&L-promulgated M&S Issuances and technical guidance.</p> <p>Standards: • Serve as the Lead Standardization Activity for M&S Standards and Methodologies, and/or lead and participate in relevant DoD and International standards activities.</p> <p>Technology: • Develop, enhance, and advocate the M&S enterprise suite of tools. • Chair M&S Community of Interest.</p> <p>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. • Continue development and enhancement of the M&S Catalog.</p>			
Accomplishments/Planned Programs Subtotals	-	-	3.377

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>	Project (Number/Name) P401 / <i>DoD Modeling and Simulation Management Office</i>

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>				Project (Number/Name) P402 / <i>Systems Engineering Research Center</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P402: <i>Systems Engineering Research Center</i>	-	-	-	5.000	-	5.000	5.000	5.000	5.000	5.000	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 fielding Department's strategy 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 2014	FY 2015	FY 2016
Title: Systems Engineering Research Center	-	-	5.000
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			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>	Project (Number/Name) P402 / <i>Systems Engineering Research Center</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
(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	-	-	5.000

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.
- Adoption of SERC methods, processes, and tools into DoD component activities.

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>				Project (Number/Name) P403 / <i>Engineered Resilient Systems</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P403: <i>Engineered Resilient Systems</i>	-	-	-	10.000	-	10.000	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

Engineered Resilient Systems (ERS) addresses the need for achieving more affordable and mission-resilient warfighting systems designed within a shorter time frame. 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 2014	FY 2015	FY 2016
Title: Engineered Resilient Systems (ERS)	-	-	10.000
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 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			

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603833D8Z / <i>Engineering Science and Technology (S&T)</i>	Project (Number/Name) P403 / <i>Engineered Resilient Systems</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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.			
Accomplishments/Planned Programs Subtotals	-	-	10.000

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 tradespace analysis.
- Demonstration and evaluation of next-generation tradespace collaboration and analysis tools, documented in analyses and technical reports.
- Use of Engineered Resilient Systems tradespace architecture and tools.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603941D8Z I <i>Test and Evaluation/Science and Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	180.734	81.247	81.033	82.589	-	82.589	85.514	90.291	97.886	99.210	Continuing	Continuing
1: <i>High Speed Systems Test</i>	35.631	17.979	24.043	21.583	-	21.583	16.903	12.544	13.900	14.112	Continuing	Continuing
2: <i>Spectrum Efficient Technology</i>	18.057	7.314	5.353	7.229	-	7.229	8.374	9.039	9.740	9.873	Continuing	Continuing
3: <i>Electronic Warfare Test</i>	37.954	11.355	12.614	12.939	-	12.939	14.528	16.758	16.095	16.310	Continuing	Continuing
4: <i>Advanced Instrumentation Systems Technology</i>	18.595	11.786	11.494	10.378	-	10.378	10.435	11.257	13.358	13.540	Continuing	Continuing
5: <i>Directed Energy Test</i>	22.519	8.243	5.443	5.525	-	5.525	7.050	7.728	8.078	8.188	Continuing	Continuing
6: <i>Netcentric Systems Test</i>	36.662	15.204	13.298	11.877	-	11.877	10.783	10.777	10.442	10.584	Continuing	Continuing
7: <i>Unmanned and Autonomous System Test</i>	8.432	5.589	4.285	6.218	-	6.218	8.640	10.658	11.359	11.513	Continuing	Continuing
8: <i>Cyberspace Test</i>	2.884	3.777	4.503	6.840	-	6.840	8.801	11.530	14.914	15.090	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, industry, and academia to accelerate development of new test capabilities. 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.

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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603941D8Z I <i>Test and Evaluation/Science and Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	83.255	81.148	83.117	-	83.117
Current President's Budget	81.247	81.033	82.589	-	82.589
Total Adjustments	-2.008	-0.115	-0.528	-	-0.528
• Congressional General Reductions	-	-0.115			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.973	-			
• Internal Adjustments	-0.035	-	-0.528	-	-0.528

Change Summary Explanation

- FY 2016 baseline adjustments: Strategic efficiency reductions in management headquarters funding and staffing for better alignment and to provide support to a smaller military force.

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>1 / High Speed Systems Test</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>1: High Speed Systems Test</i>	35.631	17.979	24.043	21.583	-	21.583	16.903	12.544	13.900	14.112	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 2014	FY 2015	FY 2016
Title: High Speed Systems Test	17.979	24.043	21.583
FY 2014 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. In FY 2014, 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			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>operability in the test environment resulting in erroneous flight performance predictions. Variable Mach number capability is required to “fly the mission” 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, variable Mach number 4.5-7.5 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. Significant progress was made this year in Phase I of the facility development including design enhancements and fabrication of the combustion cooler, installation, checkout and activation of the clean air regenerative storage heater, associated support systems, instrumentation and controls required for facility operation. The exhaust air ejector system was activated to provide longer facility run times. Design efforts for subsequent phases progressed including the critical design of the air delivery system. Another FY 2014 effort examined the incorporation of advanced morphing ceramic components for hypersonic ground test facilities into the design of common facility nozzle and ducting hardware to achieve a variable Mach number capability and variable inlet distortion patterns representative of flight-like inlet systems. Critical design of the morphing ceramic components direct-connect nozzle and distortion generator components and integrated system was completed. Fabrication of the direct-connect component fabrication was started and freejet nozzle design concepts were evaluated. 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.</p> <p>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. Following the successful completion of the benchmark HSST freejet test series utilizing an advanced hydrocarbon fueled missile scale scramjet in a larger facility, the semi-freejet test configuration testing was initiated in a smaller facility. Upon completion of the final direct connect 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. Another task, that researched improved high speed test techniques, examined the unique and extensive set of ground and flight test data collected by the X-51 program for use in the development of advanced techniques for high speed engine design, development and testing. This effort documented the test techniques used and analyzed how the test data was utilized in the engine development process so that lessons learned and important test technology gaps could be identified. The work resulted in completion of the first ever in-flight mass capture and thrust uncertainty assessment conforming to the U.S. National Uncertainty Standard.</p> <p>An arc heater flow quality 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 duration on electrode surfaces. This effort will improve the service lives of the electrodes and improve hypersonic nozzle flow quality. The conceptual design of the spin coil was completed, and spin coil power supply requirements were specified. Improved computational and numerical simulation models were completed involving magnetic field and arc column interactions with the air</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>flow in the heater necessary to investigate advanced designs and allow for efficient parallel computing of the simulations. The HSST project initiated research that will provide better determination of surface heating, viscous drag, and boundary layer growth and transition effects upon hypersonic vehicle performance. Experimental results will be used to validate state of the art prediction tools and measurements of boundary layer transition (BLT) mechanisms. Design and fabrication of hypersonic vehicle models were completed for the BLT efforts.</p> <p>An autonomous flight safety system test technology developed by HSST to assure destruction of an errant hypersonic vehicle under test was transitioned to the Operationally Responsive Space (ORS) Office. The first prototype successfully flew onboard the ORS-3/Minotaur I rocket. Compared to traditional man-in-the-loop systems, autonomous flight safety system provides wider flight corridors, over the horizon flight coverage, reduced infrastructure, remote launch site capability, and improved mission assurance; thereby maximizing safety while reducing flight test costs. Another HSST flight test technology transitioned, demonstrating advanced parameter identification maneuvers during the fourth X-51 flight. Post-test analysis confirmed that this proven optimization technique enables the acquisition of much more vehicle aero performance data in less time and fewer flights than traditional techniques, thus reducing the costs for future development systems. Progress continued toward the development of a ground based, portable high altitude light detection and ranging (LIDAR) atmospheric sensing system to measure atmospheric conditions (density, temperature, pressure, wind speed/direction, O2 content) along a hypersonic vehicle's flight path. Design, fabrication, and implementation of all components into a portable system were completed. Calibration, system validation testing, and a full demonstration in support of the Advanced Hypersonic Weapon flight test were accomplished. This technology will be a significant advancement over current technologies, improving the accuracy of determining atmospheric conditions at high altitudes needed for assessing the performance and operability of air-breathing missiles and boost-glide vehicles during development. Progress was made in advanced high speed system ground and flight test instrumentation. A prototype real gas force measurement balance system with high stiffness and frequency response to make measurements in hypervelocity flows with test times of 1-2 milliseconds was developed. The balance system was calibrated and a rigorous uncertainty analysis was performed. This will substantially increase the accuracy of high Mach force measurements that are required to evaluate and improve models of air chemistry in design and prediction codes. Development of an advanced system to measure gas properties in high speed flows was completed utilizing lasers operating in the mid-infrared spectrum along with advanced transmit and receive optical fiber systems. Two of the non-intrusive flow measurements developments for hypersonic test facilities systems, which significantly lower gas property measurement uncertainty, were fabricated and transitioned to DoD facilities. The calibration and measurement uncertainty analysis of the HSST-developed non-intrusive laser hygrometer system was completed. A high temperature shear stress sensor was successfully tested in a DoD hypervelocity wind tunnel and on a scramjet engine forebody inlet ramp. A mid-infrared thermal imaging technique effort was initiated. This technique will permit quantitative thermal imaging of hypersonic model surface flow for high enthalpies without capturing flow field emissivity effects that can shroud surface temperature imaging. Advances were achieved in the development of state-of-the-art modeling and simulation tools. Beta testing by a broad spectrum of the hypersonic community continues for an advanced three-dimensional stability and transition analysis for hypersonic boundary layer code and hypersonic nozzle characteristics based grid generation code. The code was used to support the</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>1 / High Speed Systems Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>design of a DoD hypersonic wind tunnel nozzle and a Graphical User Interface (GUI) was developed. The code was also used for development of the HSST variable Mach number nozzle and distortion generator. The advanced code was used during a hypervelocity test at Arnold Engineering Development Center (AEDC) to analyze and predict the 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. An improved Computed Tomography Method (CTM) algorithm capable of constructing more complex flow field patterns for optical absorption measurements was developed. The algorithm creates two-dimensional spatial maps of exhaust gas properties from multi-line-of-sight tunable diode laser absorption spectroscopy measurements for verifying code predictions and for determining combustion efficiency for turbine and scramjet engines. This development takes advantage of increased processing speed, higher accuracy and increased computational efficiency to greatly increase the diagnostic value of measurements from miniature, robust tunable diode laser absorption spectroscopy gas diagnostic sensor systems, which are now used for engine ground and flight testing. A project was initiated to develop a transient thermal analysis software toolset to support T&E of hypersonic vehicle Thermal Protection System (TPS) aerothermal and ablation response to high speed, high temperature flow in ground and flight test environments. A real-gas model capability was incorporated into the software flow field solver. The vitiation effects computational fluid dynamics study was completed. The study determined the ability of the Wind-US 3.0 computational fluid dynamics code to aid in the developmental test and evaluation of complex high speed/hypersonic propulsion systems and facilities utilizing existing HSST scramjet engine test data sets.</p> <p>FY 2015 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; technology for improved TPS ablation and weather effects characterization; further development of M&S codes for accurate prediction of flow fields, boundary layer transition, and heat transfer in high-speed flow; new and more accurate instrumentation systems; and application of advanced test technologies to meet other needs such as gas turbine engines and electromagnetic railguns.</p> <p>The clean-air, variable Mach number demonstration facility, 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 fixed nozzle up to Mach 7.5 conditions. The project activities will include initiation of Phase 2 to begin fabrication of the final air delivery system and design of the variable Mach nozzle.</p> <p>Scramjet ground tests in semi-free jet, and direct connect test modes will be concluded and compared to free-jet test results to quantify their respective accuracies and identify optimal test methods for larger, next generation scramjet engines. Vitation effects data will be collected to increase the high speed systems community's knowledge base to apply in using legacy tunnels. 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.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>1 / High Speed Systems Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Improved arc jet facility spin coil power control designs will be finalized and 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 development will conduct testing in 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.</p> <p>Testing and demonstration activities of high altitude LIDAR atmospheric sensing will be completed and the mobile system will be transitioned and available to support test programs at multiple flight test ranges.</p> <p>Phase 2 of the real gas force measurement load balance project will design, fabricate, calibrate, and demonstrate an advanced balance system, resulting in the first ever force and moment measurements including real gas effects on hypersonic vehicles at high Mach test conditions. Optimization of the mid-infrared thermal imaging signal-to-noise ratio as a function of test enthalpy technique will be completed. Measurement of thermal emissions from the surface of typical boost-glide type vehicle in an impulse test facility will be demonstrated. Fabrication and calibration of a miniaturized fiber optic heat flux gauge will be completed. Transition of laser hygrometer humidity sensors to AEDC engine test cells and wind tunnels, replacing less accurate and unreliable traditional hygrometers, will complete.</p> <p>Verification and improvement of computational fluid dynamics codes will continue, making use of the unique data sets obtained from the HSST scramjet engines tests and BLT experiments described above. A characteristics based grid generation advanced code with GUI will be released to the hypersonic community. A validated STABL-3D/Wind-US 3.0 transition prediction tool will be released allowing for application to complex, 3-dimensional boost-glide vehicle geometries. The transient thermal analysis software effort will complete integration of a flow field solver, aerothermal code and a structural heating code. Aero-optic distortion models will be incorporated into the transient thermal analysis software capability.</p> <p>FY 2016 Plans:</p> <p>FY 2016 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 validation and improvement of computational fluid dynamics codes.</p> <p>Progress will continue toward final integration and operation of the HAPCAT clean-air, variable Mach number aeropropulsion 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.</p> <p>Independent spin coil and arc heater power control capability demonstration as part of the arc heater flow quality project will enable more reliable and accurate arc control, longer electrode life, and reduced copper contamination in the airstream and on the test article.</p> <p>Completion of BLT efforts will establish a new baseline protocol for hypersonic aero performance predictions utilizing testing and M&S. The integrated and validated transient thermal analysis software code will be released to the hypersonic T&E community.</p>			
Accomplishments/Planned Programs Subtotals	17.979	24.043	21.583

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) 1 / <i>High Speed Systems Test</i>

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) <i>2 / Spectrum Efficient Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>2: Spectrum Efficient Technology</i>	18.057	7.314	5.353	7.229	-	7.229	8.374	9.039	9.740	9.873	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, and 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. 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) or rugged 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 infrastructure. Modern network based telemetry capabilities, like those being developed by the Central Test and Evaluation Investment Program (CTEIP) integrated Network Enhanced Telemetry (iNET) effort, enable more robust, efficient bidirectional transfer of data. DoD's strategy is to create technologies for streaming telemetry capability in C-Band, opening up legacy L- and S-Bands for 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 2014	FY 2015	FY 2016
Title: Spectrum Efficient Technology	7.314	5.353	7.229
FY 2014 Accomplishments: The SET project developed technologies to meet networked telemetry requirements and performed risk reduction for CTEIP telemetry improvement projects. A networked data recorder was developed to provide risk reduction in support of the CTEIP iNET development and subsequently tested in the CTEIP iNET Integration Laboratory. Technology enabling the dynamic reconfiguration of transmitted test data over a telemetry network was further matured. Technology to improve the efficiency of a telemetry network utilizing the advanced Shaped Offset Quadrature Phase Shift Keying (SOQPSK) modulation scheme continued.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>2 / Spectrum Efficient Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Development of a multi-band transceiver operating in the L/S/C-Band spectrum employing multiple advanced waveforms continued. SET continued an effort to autonomously analyze collected telemetry data and based on priority, select which data to transmit over the telemetry network. Additionally, SET matured several efforts to improve the performance of telemetry data links. SET continued efforts to improve the performance of a serial streaming telemetry link in a multipath environment by developing a sync marker for the telemetry data. This technology will enable analysis of the data in the event of a data dropout and permit filling in of gaps in transmitted data. Development of a telemetry transceiver capable of dynamically reconfiguring the data modulation scheme based on telemetry link conditions continued.</p> <p>Development of a non-blocking Ethernet switch for airborne platforms was completed, demonstrated, and transitioned 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.</p> <p>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, China Lake; however, the technology is extensible, enabling its widespread use across the Major Range and Test Facility Base. SET continued efforts to develop airborne phased array antenna technology to enable flexible scheduling of the T&E spectrum by incorporating both the traditional L/S bands and recently permitted C-Band frequencies. Some of these technologies will reduce the technical risk associated with beam steering in the C-Band frequencies, reduce the amount of infrastructure modifications needed to implement a C-Band telemetry capability, and provide over-the-horizon data connectivity to test large-footprint weapons, such as long range missiles.</p> <p>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 Edwards Air Force Flight Test Center to support pretest analysis of mission flight profiles.</p> <p>The SET project initiated an effort to develop digital beam forming and steering technologies for an airborne phased array antenna. 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. Additionally, SET initiated 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 will determine the performance characteristics of the bands and determine the ideal operating frequencies for telemetry purposes. Additionally, SET initiated a technical investigation to explore the use of directional optical links for telemetry purposes.</p> <p>FY 2015 Plans:</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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. Technologies to develop advanced waveforms designed to increase bandwidth efficiency will be matured. Technology to improve efficiency of a telemetry network utilizing the SOQPSK modulation scheme will be matured. Development of a telemetry transceiver capable of dynamically reconfiguring the data modulation scheme based on telemetry link conditions will continue.</p> <p>Phased array antenna technology utilizing the L/S/C-Band frequencies will continue to be matured to enable flexible spectrum scheduling and alleviate technical risk associated with tracking and beam steering in the C-Band. An effort to develop digital beam forming and steering technologies for an airborne phased array antenna will be completed, tested, and transitioned to the CTEIP program 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 as well as in airborne applications. The high directionality of phased array antenna technologies will enable spectrum spatial reuse techniques for more effective spectrum scheduling. The SET project will initiate efforts to develop an airborne multiband transceiver to support networked telemetry, increase spectrum scheduling efficiency, improve efficiency in ground telemetry and antenna systems, and support data transmission in L/S/C-bands. Several technical investigations to expand telemetry operations into non-traditional spectrum bands will be completed and the results provided to the test ranges. The technical investigation into the use of the higher frequency Ka/Ku-Bands for telemetry operations will be completed, providing analysis and recommendations on ideal operating frequencies within those spectrum bands. The technical investigation into the use of optical links to support telemetry operations will be completed. SET will initiate efforts to develop schemes to manage and provide access to telemetry links that are comprised of both contiguous and non-contiguous blocks of spectrum in the upper C-band. This portion of spectrum allocated for T&E is highly non-contiguous due to sharing with satellite and television uplinks in the spectrum band. SET will initiate an effort to develop spectrum management tools to optimize use of the available RF spectrum bands.</p> <p>FY 2016 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 some of the upper bands for use in telemetry. Additionally, the SET project will complete work to mature technologies in optimization and management of the telemetry networks through spectrum management tools.</p>			
Accomplishments/Planned Programs Subtotals	7.314	5.353	7.229

C. Other Program Funding Summary (\$ in Millions)

N/A
Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>2 / Spectrum Efficient Technology</i>

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) 3 / <i>Electronic Warfare Test</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3: <i>Electronic Warfare Test</i>	37.954	11.355	12.614	12.939	-	12.939	14.528	16.758	16.095	16.310	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 indicators, 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)

Title: Electronic Warfare Test	FY 2014	FY 2015	FY 2016
	11.355	12.614	12.939
FY 2014 Accomplishments: The EWT project completed work on a gimbaled IR sensor optomechanical interface for use on testing of IR countermeasure systems. A parallel effort using a dynamic IR optical coupler continued. Static testing and signature collection of the boost sustain motor for a surrogate missile system for testing of MANPADS IRCM scenarios completed. Hardware and software development for a 3D tracking system for testing of hostile fire indicator systems completed. The EWT project completed the design of a wideband multi-beam klystron to be used as a simulator for next-generation surface-to-air-missile systems. EWT completed a field programmable gate array design and developed and tested control hardware for a system to generate virtual radar targets using digital RF memory (DRFM) technology. EWT completed a critical design review for a new prototype real-time air-to-surface simulator for testing of semi-active radar surveillance, automatic target recognition, and bomb damage assessment radar modes.			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>The EWT project completed a design trade study for tiling of high temperature emitter arrays to enable IR scene projectors of larger formats required to test advanced ISR sensors and weapon seekers. A 1-color 100 Hz scene projector system using a superlattice light emitting diode (LED) array, meeting radiance and spectral goals was demonstrated. EWT completed the final optics assembly for a laser based mid-wave IR (MWIR) two-color simulator source. The EWT project continued development of a hyperspectral imaging projector, which will allow characterization and testing of hyperspectral imaging cameras used for ISR. The EWT project continued an effort to develop a breadboard technology to produce high-fidelity electronic counter-countermeasures (ECCM) radar signal processing techniques that employ sophisticated waveforms with algorithms, such as adaptive filtering. This test technology development addresses a need, which is identified by the CTEIP-sponsored Tri-Service Electronic Warfare Test Capabilities Study. The technology will improve testing against modern surface-to-air missile threats. Moreover, EWT continued efforts to develop a surrogate missile technology for testing of missile warning sensors.</p> <p>FY 2015 Plans: The EWT project will continue to develop an IR scene projector using digital micromirrors with long wave IR and MWIR channels. EWT will continue to develop a system for testing directed IRCM (DIRCM) systems in a high clutter environment that will additionally be used for common IRCM (CIRCM) testing. EWT will complete and demonstrate a two-color IR scene projector. Work on multistatic radar trackers for testing of hostile fire indicator 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. Based on the design completed in FY 2014, EWT will continue development of a wideband multi-beam klystron transmitter for high fidelity threat simulation of next generation surface-to-air missiles, completing the electron gun fabrication and the output cavity design, and culminating in the demonstration of 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. The EWT project will complete the Sensor and Seeker Test Requirements Study Roadmap effort and initiate an update of the Tri-Service Electronic Warfare Test Capabilities Study Roadmap. New efforts related to these roadmaps, along with the IRCM Test Resource Requirements Study Roadmap will be initiated.</p> <p>FY 2016 Plans: A prototype MWIR scene projector with apparent temperatures in excess of 1500K will complete as will a 1kHz, two-color scene generator. EWT will demonstrate a prototype wideband multi-beam klystron transmitter for high fidelity threat simulation of next generation 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 for using DRFMs to enable chamber testing of operational communications data between aircraft. The EWT project will invest in new technologies related to improving the electronic warfare T&E infrastructure. These new technologies will be identified by the Tri-Service EWT Working</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Group formed in FY 2011, and further address test needs identified in the IRCM Test Resource Requirements Study Roadmap, the Tri-Service Electronic Warfare Test Capabilities Roadmap, and the Sensors and Seekers Test Requirements Study.			
Accomplishments/Planned Programs Subtotals	11.355	12.614	12.939

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) <i>4 / Advanced Instrumentation Systems Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>4: Advanced Instrumentation Systems Technology</i>	18.595	11.786	11.494	10.378	-	10.378	10.435	11.257	13.358	13.540	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) priority investments, particularly in support of human systems, engineered resilient systems, and countering weapons of mass destruction. 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 draw for 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 2014	FY 2015	FY 2016
Title: Advanced Instrumentation Systems Technology	11.786	11.494	10.378
FY 2014 Accomplishments:			
The warfighter must conduct military operations in diverse environments to include urban, mountainous, and densely forested locations. Consequently, a continued major thrust for FY 2014 included the development of test technologies to support collection of TSPI for warfighter systems (manned or unmanned), particularly in GPS-denied or degraded environments, such as in urban canyons and tunnels. Efforts to test systems that operate in a GPS-denied environment included technology that employs a layered system of sensors leveraging collaborative navigation, existing radio frequency (RF) ranging technology, and a Doppler			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>4 / Advanced Instrumentation Systems Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>velocimeter to achieve more precise TSPI under GPS-impaired conditions. Development has been completed and a user demonstration conducted at an urban training site, achieving sub-meter accuracy (~0.6 meter), both indoor and outdoor. An inertial tracking system for dismounted warfighters continued in development; the system employs boot-mounted sensors to provide sub-meter geolocation over GPS-denied durations of greater than 2 hours. A re-design of the distance measuring radios was completed; algorithms were implemented; and the ability to geolocate a dismounted warfighter conducting activities over two hours of free movement in the absence of GPS was demonstrated.</p> <p>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 (three components of position and orientation) through the duration of projectile flight via accurate and rapid RF range observations between the projectile and ground-based components. Successful shock and spin testing have been completed; synchronization and scheduling are being optimized. The AIST project continued to develop a system to measure warfighter indoor location (GPS-denied environment) at sub-meter accuracies using ambient amplitude modulation (AM) radio broadcast signals. AM signal propagation during day and night was evaluated at an urban training range; data was collected at a variety of urban range structures noting centimeter accuracy within a prison structure. Efforts continued 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 multilateration; this included work on reducing multipath effects. Results to date indicate that 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.</p> <p>In support of other instrumentation solutions, an electro-releasable attachment technology development effort continued. This included investigation of new adhesive formulations 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 would significantly reduce the time to restore the system under test to its operational configuration. Development of the foil patch focused on improving operating temperature range and adhesion strength in preparation for environmental testing (e.g., resistance to lightning strike) and end-to-end field testing at air and ground test activities.</p> <p>The AIST project continued development of a fiber-optic instrumentation suite to integrate into test projectiles for measurement of magnetic field strength in the harsh environment of the Navy electromagnetic railgun (EMRG). Full-up testing with three EMRG shots at the Naval Surface Warfare Center-Dahlgren Division 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 are planned at higher energy levels.</p> <p>The AIST project developed algorithms and methods for automated detection and classification of marine mammal vocalizations from 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 and a baseline classifier for 6 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. This test technology supports the Navy's</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>4 / Advanced Instrumentation Systems Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Integrated Comprehensive Monitoring Program (ICMP) ensuring adherence to the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Additional classifiers have been developed or improved and will be integrated into marine mammal monitoring nodes and transitioned to the Navy's major undersea ranges.</p> <p>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.</p> <p>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 Shape accuracies for component and system measurements were over 99 percent accurate in laboratory testing; angle accuracies were well within 1 degree of the truth. A single channel breadboard system was demonstrated, displaying real-time dynamic shape data on a human test subject, producing similar accuracy results observed in laboratory settings.</p> <p>Development of technology to assess warfighter cognitive states continued. Accomplishments included developing 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.</p> <p>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; a combination of the top three mitigation approaches is estimated to provide approximately 63dB performance improvement of T&E range radars in the presence of wind turbine interference. 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.</p> <p>FY 2015 Plans:</p> <p>Major thrusts for FY 2015 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 that operate on reduced power along with the development of advanced power sources for test instrumentation.</p> <p>The AIST project will complete: the development of an inertial tracking system with boot-mounted sensors for dismounted Warfighters; a tracking technology that provides a seamless transition between outdoor and indoor environments; 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; the development and testing of magnetic field sensors for the harsh environment of EMRG test firings; an attachment technology that does not require any solvents to restore test articles to operational condition; several efforts for collecting TSPI on dismounted warfighters and related systems in GPS-denied or degraded environments such as those found in</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>4 / Advanced Instrumentation Systems Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>urban and subterranean operations; and the investigations and resulting recommendations to mitigate wind turbine effects on the nation's tests ranges.</p> <p>FY 2016 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 (RTCA) 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; decreased size, weight, and power; and micro-miniaturization of electronic components for non-intrusive applications. AIST will continue to investigate technologies for reducing or eliminating 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 position and attitude of high-velocity, spinning projectiles; fiber optic shape sensing technology for warfighter body posture, head and weapon orientation; warfighter cognitive assessment technology; and signal-of-opportunity location devices.</p>			
Accomplishments/Planned Programs Subtotals	11.786	11.494	10.378

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p> <p>E. Performance Metrics Percentage of T&E/S&T projects progressing satisfactorily toward technical, financial, schedule, and risk mitigation goals.</p>
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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>5 / Directed Energy Test</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>5: Directed Energy Test</i>	22.519	8.243	5.443	5.525	-	5.525	7.050	7.728	8.078	8.188	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 2014	FY 2015	FY 2016
Title: Directed Energy Test	8.243	5.443	5.525
FY 2014 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 preliminary design completed. The system components were shocked tested.			
The DET project completed two efforts to develop an HEL test planning tool providing a probabilistic based glint hazard analysis tool for assessing risks to personnel, aircraft, and sensors.			
Fabrication continued on 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 continued. The laboratory demonstration and testing of the sub-systems completed. This technology simultaneously measured profiles for three parameters: optical turbulence, water vapor content, and aerosol attenuation.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>5 / Directed Energy Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>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 preliminary design review.</p> <p>Testing of electric and magnetic field sensors continued in support of electromagnetic railgun (EMRG) T&E with development of new techniques to reduce noise on these measurements; these techniques increased the quality of data obtained to benchmark railgun development codes. DET developed a prototype miniature differential current measurement system that measures the current at nodes in a target circuit, allowing analysis of HPM effects at sub-component level. DET also developed 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.</p> <p>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 5 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, is a gap in current MIL-STD-464C testing.</p> <p>The DET project initiated a study of options for technology replacement of the WSMR fast burst reactor for sources that simulate nuclear weapon prompt radiation output (neutron radiation) for survivability testing of U.S. systems. The driver of this effort is a more cost effective means of creating neutron radiation.</p> <p>FY 2015 Plans:</p> <p>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 beam propagation through the atmosphere including those in the maritime environment to support emerging needs of the Navy.</p> <p>Initiatives to achieve very small, non-intrusive current and voltage sensors to measure HPM effects inside a target will be continued. These technologies will be transitioned to at least two locations to demonstrate the flexibility of these approaches. A small, minimally intrusive data acquisition device with a wide bandwidth to complement that of the non-intrusive electric and magnetic field sensors will be completed.</p> <p>An effort to develop an HPM source for use in a chamber to address survivability of munitions in an HPM environment will be continued.</p> <p>The new study investigating technologically viable, more cost effective alternatives to provide the neutron radiation required for nuclear survivability testing will be continued.</p> <p>FY 2016 Plans:</p> <p>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 1 micron. This includes efforts to characterize the performance of HEL systems as they test against small targets such as rockets, missiles, artillery, and unmanned aerial vehicles.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>5 / Directed Energy Test</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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	8.243	5.443	5.525

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) 6 / <i>Netcentric Systems Test</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
6: <i>Netcentric Systems Test</i>	36.662	15.204	13.298	11.877	-	11.877	10.783	10.777	10.442	10.584	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Net-Centric Systems Test (NST) project is pursuing test technologies to emulate multi-Service, Joint, and coalition net-centric operations in a system of systems test and evaluation (T&E) environment. Additionally, the NST project develops technologies to analyze and evaluate the increasingly massive amounts of structured and unstructured data generated by complex net-centric tests. The technology to conduct T&E on net-centric systems is challenged by 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 an accurate, timely transfer of data (e.g., target tracks, weapons allocation, mission tasking and situational awareness) as the data passes among different systems of Service and coalition participants.

The NST technologies advance test automation (test planning, test execution, test control, and analysis) that enable the virtual integration of Department of Defense (DoD) weapon laboratories and open air ranges. Using models and simulations along with hardware-in-the-loop 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 to the Global Information Grid. Furthermore, many of the warfighting capabilities being developed to support net-centric military operations are software-intensive and test technologies must be developed to fully characterize these systems.

Also included are technologies to support the testing and agile environment associated with Engineering Resilience Systems, a high-priority S&T area for the Department. The technology development efforts within the NST project have been prioritized to align with DoD guidance on science and technology (S&T) priority investments, particularly in measuring “Data to Decision” techniques in warfighting capabilities. Ultimately, the NST portfolio enables the T&E community to “test like we fight” by replicating net-enabled, Joint mission operations within a T&E environment.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Netcentric Systems Test	15.204	13.298	11.877
FY 2014 Accomplishments: The NST project focused on 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. Additionally, the NST project developed technologies to support the measurement and analysis of the net-centric test environment including technologies that support enterprise level test execution assessment and control. The NST project developed an architecture-driven mission effectiveness planning and visualization technology to support Design of Experiments-based end-to-end assessments. Moreover, NST developed an effectiveness measures framework that includes new TENA object model definitions that enable automated T&E planning and a real-time analysis tool. Development of a distributed policy-based access control capability for the TENA middleware completed. This technology showcased end user authentication, enforcement of the defined access control policy prior to joining the TENA			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) <i>6 / Netcentric Systems Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>execution, and the automatic distribution of the required certificates, keys, and login tokens. The NST project began development of technologies that apply automated analysis of large net-centric systems data sets using cloud computing technologies. Development began on technologies that will provide an acoustic propagation model to provide sufficient fidelity to test torpedo performance operating in a range dependent propagation environment. This technology will provide a real-time simulation/emulation system for testing torpedo sonar systems in multiple bathymetry, biological and threat environments.</p> <p>FY 2015 Plans: Development will continue on technologies to support the use of TENA over a broad range of networks and to provide a common interoperability test architecture. Modeling and simulation technologies to support emulation and stimulation of networks for conducting T&E along with simulation fidelity assessments in the T&E context will be investigated. Technology developments will focus on semantic analysis of large data sets, including 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. The NST 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. The NST project will investigate technologies that assess DoD platforms employing big data techniques and facilitate T&E of warfighter systems in an agile communication environment.</p> <p>FY 2016 Plans: Work started in FY 2015 will continue. The NST project will invest in developing CDS/MLS, assessing DoD platform's employing big data techniques and T&E of warfighting systems in a net-enabled agile environment. Developments will include verification and validation across integrations and aggregation techniques for systems evaluation.</p>			
Accomplishments/Planned Programs Subtotals	15.204	13.298	11.877

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) 7 / <i>Unmanned and Autonomous System Test</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>7: Unmanned and Autonomous System Test</i>	8.432	5.589	4.285	6.218	-	6.218	8.640	10.658	11.359	11.513	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 autonomous systems' 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, working 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)

Title: Unmanned and Autonomous System Test	FY 2014	FY 2015	FY 2016
FY 2014 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 free, 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 bugs to find vulnerabilities without costly field testing. The test technology was developed and implemented as a prototype to enable black box system automated autonomy architecture stress testing, 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 interface. This technology provided testers with a perspective of system performance and a previously unavailable prediction of behavior. This automated stress testing tool was initially transitioned and integrated into the development and T&E processes for the Autonomous Mobility Appliqué System (AMAS), a multiplatform kit that integrates low-cost sensors and control systems onto U.S. Army and Marine Corps tactical vehicles to assist drivers or enable	5.589	4.285	6.218

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) 7 / <i>Unmanned and Autonomous System Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>autonomous operation in convoys. Additionally, the UAS stress test tool was used on the Autonomous Aerial Cargo/Utility System (AACUS), an Naval prototype that explores advanced autonomous capabilities for reliable resupply/retrograde and, in the long term, casualty evacuation. In both cases, the UAST project stress testing technology identified failure modes before they were triggered in the field. Development continued on technology for test infrastructure that combines synthetic and actual forces to produce a realistic, real-time, interactive autonomous vehicle test environment. This technology is also being developed to provide safe testing assurances via on-board safety monitoring.</p> <p>FY 2015 Plans: Work on virtualizing test sites will complete and transition to T&E agencies as will the stress testing tool. Development of technology that combines synthetic and actual forces to produce a realistic, real-time, interactive autonomous vehicle test environment will continue. 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 our national ranges. 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 initiate research in the area of autonomous system test planning to develop technologies which develop the most salient test plans for maritime, air, and ground-based autonomous systems and enable test ranges to identify the degree of regression testing required for autonomous systems upon changes to the hardware and software.</p> <p>FY 2015 Plans: Work on virtualizing test sites will complete and transition to T&E agencies as will the stress testing tool. Development of technology that combines synthetic and actual forces to produce a realistic, real-time, interactive autonomous vehicle test environment will continue. 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 our national ranges. 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 initiate research in the area of autonomous system test planning to develop technologies which develop the most salient test plans for maritime, air, and ground-based autonomous systems and enable test ranges to identify the degree of regression testing required for autonomous systems upon changes to the hardware and software.</p> <p>FY 2016 Plans: Technology that combines synthetic and actual forces to produce a realistic, real-time, interactive autonomous vehicle test environment will complete and transition. The UAST project will continue to develop test technology that addresses 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,</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
decisions, and action. Additionally, the UAST project will focus on enhancing the test environment to assess unmanned threat systems. The UAST project will initiate efforts to enable dynamic construction, control, measurement of complex systems-of-autonomous-systems and tactically meaningful counter-unmanned systems analysis. 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	5.589	4.285	6.218

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>				Project (Number/Name) 8 / <i>Cyberspace Test</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
8: <i>Cyberspace Test</i>	2.884	3.777	4.503	6.840	-	6.840	8.801	11.530	14.914	15.090	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 need advancement and maturation of various 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 2014	FY 2015	FY 2016
Title: Cyberspace Test	3.777	4.503	6.840
FY 2014 Accomplishments:			
The CTT project continued threat intelligence gathering, analysis, and design which resulted in successful demonstration of threat traffic generation and automated attack. The CTT project also successfully demonstrated the initial framework for automated and verified sanitization processes on commodity information technology (IT) assets and began risk reduction for sanitization of candidate specialized IT assets. This technology will eliminate traces of contaminating cyber attacks between tests, an important step in the cyberspace test execution process.			
The baseline CTT roadmap was completed, mapping technologies to needs that synchronize with overall Department cyberspace plans.			
FY 2015 Plans:			
The threat and sanitization technology development will continue. The threat effort will focus on maturing cyberspace threat representation and instrumentation technologies required to assess cyberspace vulnerabilities and to improve the agility of cyberspace test capabilities.			
The sanitization technology development will focus on maturing test technologies to develop a reliable, fast, automated, and cost-effective sanitization approach for militarized electronic systems. This will allow the rapid repurposing of equipment between different tests to meet the expanding requirements for cyber testing.			
FY 2016 Plans:			
The threat work and sanitization technology will finish and transition to cyber test organizations. The CTT project will continue to seek out and mature technology developments addressing the need to provide automated cyberspace test planning, create			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603941D8Z / <i>Test and Evaluation/ Science and Technology</i>	Project (Number/Name) 8 / <i>Cyberspace Test</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
representative cyberspace threats and test environments, execute cyberspace tests, and perform cyberspace test analysis and evaluation. These efforts will support defensive and offensive cyberspace weapon systems testing, as well as, cyber resiliency testing.			
Accomplishments/Planned Programs Subtotals	3.777	4.503	6.840

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	51.875	47.240	46.300	37.420	-	37.420	38.912	38.873	41.433	41.873	Continuing	Continuing
P455: <i>Operational Energy Capability Improvement</i>	48.625	32.327	46.300	37.420	-	37.420	38.912	38.873	41.433	41.873	Continuing	Continuing
P456: <i>Hybrid Energy Storage Module (HESM)</i>	3.250	14.913	-	-	-	-	-	-	-	-	Continuing	Continuing

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 two projects.

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, demonstrate and transition into use operational energy technologies and practices that will improve DoD military capabilities and/or reduce costs. Second, to establish within the military Services sustainable, institutional capacity to continue to research, develop and adopt operational energy innovations. OECIF funds serve as "seed money" to start or consolidate promising operational energy programs 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 ASD(R&E) and ASD(OEPP), 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).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0604055D8Z I <i>Operational Energy Capability Improvement</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	47.001	31.800	37.584	-	37.584
Current President's Budget	47.240	46.300	37.420	-	37.420
Total Adjustments	0.239	14.500	-0.164	-	-0.164
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	14.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.239	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	-	-	-0.164	-	-0.164

Change Summary Explanation

FY 2016 funding increase due to Congressional restoral of funding to FY 2014 levels.

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Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>				Project (Number/Name) P455 / <i>Operational Energy Capability Improvement</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P455: <i>Operational Energy Capability Improvement</i>	48.625	32.327	46.300	37.420	-	37.420	38.912	38.873	41.433	41.873	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, demonstrate and transition into use operational energy technologies and practices that will improve DoD military capabilities and/or reduce costs. Second, to establish within the military Services sustainable, institutional capability to continue to research, develop and adopt operational energy innovations. OECIF funds serve as “seed money” to start or consolidate promising operational energy programs 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)

Title: Operational Energy Capability Improvement Fund	FY 2014	FY 2015	FY 2016
FY 2014 Accomplishments: The expeditionary outpost energy load reduction focus and Waste to Energy (W2E) programs begun in FY12 were continued. The Advanced, Energy Efficient Shelter Systems for Contingency Basing (AEESS) program performed full prototype technical evaluations in Kuwait and Guam. The Super Energy Efficient Containerized Living Unit (SuperCLU) program tested and verified improved CLUs and split system Environmental Control Units (ECU), expeditionary air conditioners, at multiple military facilities. The Innovative Cooling Equipment (ICE) program received 9K, 18K, 36K and 60KBTU improved ECUs that were successfully tested to show energy savings from 16 to 54%. The Navy Expeditionary Technology Transition Program (NETTP) explored and proved the concepts of two dehumidification membranes and continued development of two waste heat based ECUs and a Stirling engine based ECU. The Transformative Reductions in Operational Energy Consumption (TROPEC) program assessed a collection of energy efficiency and man portable systems in summer testing. In the W2E program with the Strategic Environmental Research and Development Program (SERDP), four designs were prototyped, tested and component improvements begun. The operational energy consortia programs begun in FY13 also progressed. The Engineered Surfaces Materials and Coatings for Drag Reduction program identified additional legacy fleet drag reduction technologies - non-structural Outer Mold Line (OML) "add-ons" with potential to reduce drag penalties of pylon and winglet integration on C-17 aircraft, the Air Forces largest fuel consumer. A BAA was issued to establish a consortium-like team to pursue other drag reduction technologies, with emphasis on non-traditional technology providers. The Energy Efficient Outpost Modeling Consortium (EEOMC) established initial optimization	32.327	46.300	37.420

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>	Project (Number/Name) P455 / <i>Operational Energy Capability Improvement</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>models for the Energy Resource Planning Tool and identified key parameters for a baseline commander dashboard application. An executive level energy education course was developed to aid the shift to an energy aware culture. The Tactical Microgrid Standards Consortia (TMSC) established three working groups of Subject Matter Experts (SMEs) drawn from the Services. Five major gaps in existing microgrid standards were identified and the program developed plans to address them. The Soldier and Small Unit Power (Soldier Power) program established a government steering committee from the requirements, S&T and acquisition communities, and formulated the next generation Soldier Power and Energy architecture.</p> <p>Six new programs were selected to begin in FY14 to improve analytical methods for considering operational energy in DoD planning and management processes above the platform/engineering level. The Marines will develop the Expeditionary version to the Synthetic Theater Operations Research Model (STORM-E) to explicitly incorporate energy issues for an expeditionary force at the campaign level. OECIF funding will augment and deepen the work of the Army's Operational Energy Analysis Task Force (OEATF) program, supporting work in data, scenarios and modeling tools. The Joint Deployment Energy Planning and Logistics Optimization Initiative (J-DEPLOI) program will fold operational energy considerations into the Joint Operational Planning Process (JOPP) at Pacific Combatant Command (PACOM). The Comprehensive Operational Energy Toolkit (COE Toolkit) program will develop tools to examine the mission level effects of attacks on energy supplies at and in route to air bases. The Energy Integration and Interoperability (Energy I&I) program will fold energy considerations into a kill chain analysis technique for the Navy. The Capability Assessment and Modeling for Energy Logistics (CAMEL) program, led by the Air Force Research Lab (AFRL), will develop operational energy analysis tools for the mobility air force, including airlift, air to air refueling, and cost benefit analysis. With better methods and tools for understanding the burdens and vulnerabilities imposed by operational energy and how it affects our military effectiveness, planners and decision makers will be able to make better informed choices.</p> <p>FY 2015 Plans: The expeditionary outpost energy load reduction focus and W2E programs begun in FY12 will generally be reaching their conclusion. AEES plans to hold cold weather demonstrations in Ft Greely, Alaska and Ellsworth AFB and hot weather demonstrations in Holloman AFB of improved shelter systems. SuperCLU is currently testing the improved CLUs and split system ECUs in Guam and Florida, and plans to test at Camp Lemonnier, Djibouti in February and the Philippines in May. The ICE program will conduct capability demonstrations and testing of the improved 9K, 18K, 36K and 60KBTU ECUs at CERDEC and the Army's TECD-4a demonstration. NETTP will demonstrate Technology Readiness Level (TRL) 6 for two waste heat powered ECUs and a five ton cooling Stirling ECU. TROPEC will perform another set of lab and field assessments, and will continue its shift toward funding by other DoD users. The W2E program will be testing with a variety of surrogate waste streams in order to mimic real world contingency base operations and the prototype system designs will be improved and developed for potential demonstration validation efforts.</p>			

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

	FY 2014	FY 2015	FY 2016
<p>The consortia programs will progress. The TMSC program will work closely with the technical sub-groups and other consortium members to start developing draft standards where commercial power systems standards are not adequate for the tactical environment. EEOMC's Energy Resource Planning Tool will be enhanced with increased time steps, load generation tool development and completion of sub-modules describing photovoltaic and battery systems. Soldier Power will develop and evaluate intelligent power management approaches, low power demand soldier electronics technologies, high power/energy density power generation and energy storage systems, and actionable non-materiel recommendations to reduce the Soldier Power operational energy burden. The Engineered Surfaces Materials and Coatings Drag Reduction program will quantify benefits on C-17 aircraft by the addition of non-structural OML "add-ons" to reduce drag associated with pylon and winglet integration. In addition, the program will establish a consortium-like team, hold a workshop to inform technology providers of program requirements and goals, and fund the most promising drag reduction technologies.</p> <p>The analytical method programs selected and started in FY14 will ramp up. The STORM-E program will transition the STORM database to the Pacific theater, address additional/alternative data requirements and identify evolving analytical focus and data requirements for campaign-level assessments of operational energy to inform STORM-E Roadmap. The OEATF program will begin developing the scenarios, data, and simulation capability to assess operational energy across a range of operational environments. The J-DEPLOI program will analyze the Joint Operational Planning Process's (JOPP) current logistical capacity and vulnerability planning gaps, assess over two dozen existing defense information technology tools to determine the best architecture and database candidates for an operational energy insertion method, and select the best fit to address those gaps. The COE Toolkit program will develop tools to examine evolving weapons and targeting impacts against a variety of energy related targets. The Energy I&I team will begin planning for Valiant Shield 2016 and actively employ the Energy I&I analytical methodology within the Navy. The CAMEL program will develop and/or leverage modeling, simulation, and analysis (MS&A) solutions to close airlift and air refueling mission gaps.</p> <p>The new FY15 programs will significantly expand on-going collaboration with DOE under the Advanced Vehicle Power Technology Alliance. The primary emphasis will be improving the energy efficiency/range and, hence, the military capability from DoD's legacy tactical ground vehicles. This effort might cover such technologies and topics as electrification of auxiliaries, engine controls, drive trains, and lightweighting. In addition, a Marine and Army program to demonstrate energy harvesting technology at the company level and improve the data on actual duty cycles of dismounted troops' equipment will also begin; this will complement the Soldier Power consortia program begun in FY13.</p> <p>FY 2016 Plans: The consortia programs will continue. TMSC, with the support of DoD, DOE, NIST, IEEE and other professional societies will review and revise draft standards. EEOMC's Energy Resource Planning Tool will implement additional user-selectable parameters reflecting geographic location and mission duration, and initiate hardware testing and integration into the Virtual</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Forward Operating Base system. The Soldier Power program will conduct integration and field testing of integrated soldier power and data management systems, reduced power demand soldier electronics, and high power/energy density power generation and energy storage technologies. The Engineered Surfaces for Drag Reduction program will mature the best candidate drag reduction technologies and conduct flight tests as appropriate.</p> <p>The analytical methods programs will also continue. STORM-E will incorporate Spiral 1 into the USMC analytical environment for Expeditionary Force 21 (EF 21) and perform studies with the Pacific theater scenarios to refine EF 21 operational concepts. The OEATF program will complete the development of the OE analytic capabilities, conduct validation and verification of the simulations, and provide the capability to the user community. J-DEPLOI will develop user-defined requirements for and a prototype of an IT tool to be used by joint operational planners to address any non-materiel changes in tactics and procedures required, and assess results against JOPP modification objectives. The COE Toolkit program will develop tools to track the logistics of the energy network and interdiction of energy resources in route to a base. The Energy I&I program will roll out the Energy I&I Analytical Methodology to the USAF to develop a joint sea and air effects/kill chain approach. The CAMEL program will execute analyses focusing on aerial refueling missions and identify MS&A capability and data gaps specific to the operational burdens of various capabilities.</p> <p>The effort begun in FY15 to improve the energy efficiency of DoD's legacy tactical ground vehicles, in collaboration with DOE, will continue to ramp up. The Marine/Army energy harvesting program will focus on system of system integration with heavy emphasis on incremental field evaluations building to the final company level trial.</p> <p>New programs starting in FY16 will reflect a continuing shift within OECIF from an emphasis on contingency bases to one of mobile platforms. Given OECIF's on-going work on energy efficient ground vehicles, improving the energy efficiency of sea or air platforms will be of primary interest. Of particular interest could be reducing the loads, including hotel loads, on such platforms. The focus of such new programs may also reflect input from various communities of interest within DoD - such as Energy and Power, Ground and Sea Platforms, and Air Platforms - and the results from OEPP's oversight of the research programs of the Services and any developing gaps identified by OEPP.</p>			
Accomplishments/Planned Programs Subtotals	32.327	46.300	37.420

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>	Project (Number/Name) P455 / <i>Operational Energy Capability Improvement</i>

D. Acquisition Strategy

N/A

E. Performance Metrics

None

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>				Project (Number/Name) P456 / <i>Hybrid Energy Storage Module (HESM)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P456: <i>Hybrid Energy Storage Module (HESM)</i>	3.250	14.913	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

P456, the Hybrid Energy Storage Module (HESM), co-sponsored by ASD(R&E) and ASD(OEPP), 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, 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 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 2014	FY 2015	FY 2016
Title: Hybrid Energy Storage Module (HESM)	14.913	-	-
Description: P456, the Hybrid Energy Storage Module (HESM), co-sponsored by ASD(R&E) and ASD(OEPP), develops advanced technology in energy storage 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 this program 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. This program is closely coordinated with the Advanced Management and Protection of Energy-storage Devices (AMPED) program of the Department of Energy's Advanced Research Projects Agency - Energy (ARPA-E). AMPED technology will be used to potentially extend the operational performance benefits and safety for these applications beyond the hybrid storage module baseline design configurations.			
FY 2014 Accomplishments: The HESM efforts initiated in FY 12 and FY13 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 validation & verification of advanced complex controls. Additional effort including Air Force/Navy aircraft, Navy ships HESM, and Safe Energy Storage demonstrator development were continued. Efforts associated with Army and USMC battlefield generator and vehicle HESM demonstrator development were completed. Technology transition agreements were signed by OPNAV N96.			
Accomplishments/Planned Programs Subtotals	14.913	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / <i>Operational Energy Capability Improvement</i>	Project (Number/Name) P456 / <i>Hybrid Energy Storage Module (HESM)</i>

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0303310D8Z / <i>Countering Weapons of Mass Destruction (CWMD) Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	39.134	47.819	46.001	42.488	-	42.488	45.335	42.781	46.239	46.864	Continuing	Continuing
P*004: <i>Countering Weapons of Mass Destruction Systems</i>	39.134	47.819	46.001	42.488	-	42.488	45.335	42.781	46.239	46.864	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Countering Weapons of Mass Destruction (CWMD) Systems program is researching, developing, integrating, testing, deploying, operating, and maintaining 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 foster a shared understanding of the CWMD operating environment and support decision making for operations and activities 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 small 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, 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, the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance, and capability requirements approved by the Joint Requirements Oversight Council. 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, 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 RDT&E program elements (0303310D8Z for research, development, testing and evaluation 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) line (ORC 2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

This Program Element can fund travel to support the requirements of this program.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0303310D8Z / <i>Countering Weapons of Mass Destruction (CWMD) Systems</i>
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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	49.221	46.066	42.774	-	42.774
Current President's Budget	47.819	46.001	42.488	-	42.488
Total Adjustments	-1.402	-0.065	-0.286	-	-0.286
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.402	-			
• Program Adjustments	-	-	-0.286	-	-0.286
• FFRDC Sec 8104	-	-0.065	-	-	-

Change Summary Explanation

Efficiencies gained from program and fusion cells maturing.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0303310D8Z / <i>Countering Weapons of Mass Destruction (CWMD) Systems</i>				Project (Number/Name) P*004 / <i>Countering Weapons of Mass Destruction Systems</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P*004: Countering Weapons of Mass Destruction Systems</i>	39.134	47.819	46.001	42.488	-	42.488	45.335	42.781	46.239	46.864	Continuing	Continuing

A. Mission Description and Budget Item Justification

Planning Guidance, and capability requirements approved by the Joint Requirements Oversight Council. 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, 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 RDT&E program elements (0303310D8Z for research, development, testing and evaluation 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) line (ORC 2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

The CWMD Systems program is researching, developing, integrating, testing, deploying, operating, and maintaining 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 foster a shared understanding of the CWMD operating environment and support decision making for operations and activities 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 small 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, 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, the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance, and capability requirements approved by the Joint Requirements Oversight Council. 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, 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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0303310D8Z / <i>Countering Weapons of Mass Destruction (CWMD) Systems</i>	Project (Number/Name) P*004 / <i>Countering Weapons of Mass Destruction Systems</i>
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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.

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 2014	FY 2015	FY 2016
<p>Title: Countering Weapons of Mass Destruction (CWMD) Systems</p> <p>Description:</p> <ul style="list-style-type: none"> • Research, develop, test, and evaluate next-generation materiel and non-materiel solutions to locate, gather, fuse, share, and visualize WMD and CWMD information, and facilitate collaboration and well-integrated decision making. • CWMD Systems will support 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, visualize information for analysts, operators, decision makers. • Materiel solutions will include an enterprise-scale common data and applications environment, operating on the Global Information Grid (GiG) as well as the World Wide Web (WWW). • Materiel solutions 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 two small fusion cells that will monitor, analyze, and disseminate integrated WMD intelligence and information and CWMD activities in support of US Combatant Commands, the Services, Defense Agencies, and other US Government partners in the CWMD mission. <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Combined what had been separate systems (Global CWMD Awareness System (GCAS), designed to reside on classified systems, and Global Knowledge Management Capability (GKMC), designed for unclassified systems) into a single program, called Constellation, with a common IT architecture that will be deployed across multiple security domains. • Delivered and demonstrated pre- prototype version of data and applications environment. • Developed Constellation platform that can function at all levels of classification and is able to share information among and between those classification domains. • Developed a system architecture for Constellation that is compatible with the DoD Joint Information Environment (JIE) and Intelligence Community Information Technology Enterprise (IC-ITE) frameworks. 	47.819	46.001	42.488

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Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0303310D8Z / <i>Countering Weapons of Mass Destruction (CWMD) Systems</i>	Project (Number/Name) P*004 / <i>Countering Weapons of Mass Destruction Systems</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Established two small fusion cells to support Constellation system development. • Identified and reached agreement with select mission partners to conduct initial operational activities in FY14 and beyond. • Developed data sharing and cooperative agreements with some U.S. Government agencies, international partners, and non-governmental organizations. • Demonstrated a limited capability prototype integrating materiel and non-materiel components. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> • Received authorities to operate prototype system components on NIPRNET, SIPRNET, and JWICS networks. • Implemented initial cross-domain solutions to securely transfer information among networks. • Continued development and/or integration of software applications, with six-month release spirals of new capabilities, tied to demonstrations, exercises, experiments, and deployments. • 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. • Scaled hardware to support additional users; integrated and tested analytical engine updates. • Achieved network and system certifications and accreditations. <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> • Achieve initial operational capability by middle of fiscal year 2016, including authorities to operate on all networks and cross-domain solutions securely transferring data bi-directionally across security domains. • Expand Combatant Command, interagency, and international partnerships to support system development, data access and sharing, and operational employment. • Complete integration of Constellation into other fielded systems and capabilities on NIPR, SIPR, and JWICS networks. • Expand fusion cells capacity. 			
Accomplishments/Planned Programs Subtotals	47.819	46.001	42.488

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Utilize a knowledge based approach to achieve an operational prototype in FY14 with capability packages that provided upgraded CWMD situational awareness and capabilities with deliveries every 12-18 months utilizing agile software development processes.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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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 ASD/NCB. Maintain cost, schedule, and performance reporting, review, and adjudication. Maintain requirements traceability matrix.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603161D8Z I <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	93.320	46.889	41.014	31.710	-	31.710	32.244	38.426	41.257	41.843	Continuing	Continuing
P162: <i>Nuclear and Conventional Physical Security</i>	93.320	23.534	28.545	28.359	-	28.359	28.676	31.449	34.065	34.506	Continuing	Continuing
P041: <i>CNT Rad/Nuc Passive Defense ADC&P</i>	0.000	1.927	-	-	-	-	-	-	-	-	Continuing	Continuing
P040: <i>National Technical Nuclear Forensics Systems</i>	0.000	21.428	12.469	3.351	-	3.351	3.568	6.977	7.192	7.337	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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	48.302	41.072	41.762	-	41.762
Current President's Budget	46.889	41.014	31.710	-	31.710
Total Adjustments	-1.413	-0.058	-10.052	-	-10.052
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.413	-			
• Internal realignment	-	-	-9.962	-	-9.962
• FFRDC	-	-0.058	-	-	-
• Economic Assumptions	-	-	-0.090	-	-0.090

Change Summary Explanation

Realign RDT&E funding under CWMD Procurement line for the National Technical Nuclear Forensics mission. Also moved \$900K from this Program Element to PE 0605161D8Z in order to align all contract support requirements under this Management Support RDT&E line.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P162: Nuclear and Conventional Physical Security	93.320	23.534	28.545	28.359	-	28.359	28.676	31.449	34.065	34.506	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 2014	FY 2015	FY 2016
Title: Detection and Assessment	3.903	8.554	9.787

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Conducted Explosive Detection Equipment testing (Sensor Fusion: Raman and Infrared and Comparative Test & Evaluation of X-ray technology) • Developed wide-area, long-range, foliage, seismic and radiological detection capability (both fixed & mobile) • Developed waterside detection & tracking capability (underwater & land-water interface) • Conducted fence sensors & cold weather testing <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • 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 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • 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 			
<p>Title: Access Controls</p> <p>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.</p> <p>FY 2014 Accomplishments:</p>	2.060	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Conducted Defense Installation Access control Joint Capability Technology Demonstration--determine if technology meets requirements. Advanced technology and procedures to minimize an insider threat to intentionally exceed or misuse an authorized level of access to nuclear materials or weapons. 			
<p>Title: Installation and Transport Security</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed an Integrated Waterside Security capability and conduct a concept demonstration Developed a near-shore unified tactical response capability <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Address technology gaps after Integrated Waterside Security concept demonstration Continue to develop a near-shore unified tactical response capability <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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 	3.364	4.570	9.321
<p>Title: Storage and Safeguards</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed specifications for Ordnance Storage and Operating Facilities that addresses explosives safety and physical security design requirements Designed a Semi-Hardened Prime Nuclear Air Force Secure Transport Container 	1.576	4.291	-

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Designed a RFID Tagging for Items in Extreme Cold Storage (CONUS) <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Finalize design of a Semi-Hardened Prime Nuclear Air Force Secure Transport Container Design an internal delay capability for the Secure Transportable Maintenance System 				
<p>Title: Prevention</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Expanded engagement opportunities with international partners in Nuclear Security Developed nuclear threat-related scenarios & use cases to frame Countering Nuclear Threat situational awareness development <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Expand engagement opportunities with international partners in Nuclear Security 		5.503	1.275	-
<p>Title: Decision Support Systems</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed capability to ensure threat alert and response systems are interoperable with equipment used by the DoD and mutual aid partners in the local communities Provided a backbone extending command and control and situational awareness within, between, and out to the edges of the missile launch facility complex Developed 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 <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> 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) 		4.049	5.254	4.836

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Finalize the development of a risk analysis tool to help commanders' in the field make sound security decisions 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 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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 DoD Nuclear Weapons Complex Critical Infrastructure Analysis 			
<p>Title: Analytical Support</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Provided DOD and industry the means to achieve PSE interoperability through the development of physical security standards and interface control devices Conducted analyses and review of requirements, evaluates proposed RDT&E solutions and recommends priorities for the integrated investment portfolio <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> 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 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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 	3.079	4.601	4.415
Accomplishments/Planned Programs Subtotals	23.534	28.545	28.359

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Defense Security Enterprise Architecture	Various	Multiple performers : Multiple locations	-	1.324		1.700		1.450		-		1.450	-	-	-
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		1.900		-		1.900	-	-	-
Joint Risk Decision Support Tool	MIPR	AF Civil Engineering Center : Tyndall AFB, FL	-	1.019		1.052		1.800		-		1.800	-	-	-
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	-		1.813		8.441		-		8.441	-	-	-
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		-		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Radar Assisted Area Protection	MIPR	US Army ARDEC : Picatinny Arsenal, NJ	-	1.105		2.874		2.500		-		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		0.324		-		-		-	-	-	-
Secure Transportation Maintenance System Internal Delay	IA	Sandia National Labs : Albuquerque, NM	-	0.741		1.362		-		-		-	-	-	-
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		-		1.250	-	-	-
Detection & Assessment Follow-on	TBD	TBD : TBD	-	-		1.500		2.500		-		2.500	-	-	-
Maritime Expeditionary & Transit Security	TBD	TBD : TBD	-	-		0.760		1.255		-		1.255	-	-	-
US Navy Spike Weapon System, Common Launch Tube	MIPR	NAVAIRWARCENWPNDIV : China Lake, CA	-	-		1.000		1.555		-		1.555	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Thermal Imaging Dual-use for Aerosol Monitoring Alarms and Security	TBD	TBD : TBD	-	-		0.700		1.678		-		1.678	-	-	-
Multi-sensor Detection and Discrimination	MIPR	TBD : TBD	-	-		0.590		0.650		-		0.650	-	-	-
Subtotal			93.320	21.596		25.740		24.979		-		24.979	-	-	-

Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
World Institute for Nuclear Security	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	-	0.300		0.350		0.350		-		0.350	-	-	-
International Atomic Energy Agency Support	IA	Department of State : Washington, DC	-	0.200		0.300		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	-	-	-
Subtotal			-	1.230		0.850		0.900		-		0.900	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Detection & Assessment IPT	MIPR	AF Security Forces Center : Lackland AFB, TX	-	0.200		0.250		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		-		0.455	-	-	-
Explosive Detection Equipment Guide	MIPR	NAVEODTECH : Indian Head, MD	-	-		0.700		0.850		-		0.850	-	-	-
JASON Study	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	-	-		0.500		0.525		-		0.525	-	-	-
Monterey Institute of International Studies	MIPR	Defense Threat Reduction Agency : Ft Belvoir, VA	-	-		0.250		0.300		-		0.300	-	-	-
Subtotal			-	0.708		1.955		2.480		-		2.480	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	93.320	23.534	28.545	28.359	-	28.359	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

Radiological Detection System (RDS) Milestones

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
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

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

**IGSSR-C
Milestones**

Milestones	Baseline Date	Current Date	Completed Date	FY 13				FY 14				FY 15																					
				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						
Integrated Base Defense Software Synch Meetings	Quarterly																																
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										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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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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LEGEND

Planned Actions

In-Progress Actions



Completed Actions

Enhanced Interdiction Milestones










Milestones	Baseline Date	Current Date	Completed Date	FY 13			FY 14				FY 15																
				Q3		Q4		Q1		Q2		Q3		Q4		Q1		Q2		Q3							
				A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
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												Bangor on 7 May, KB on 22 May													
Ops Demo	1/5/2015	1/5/2015																									
Transition	3/30/2015	3/30/2015																									
Final Report Submitted	5/25/2015	5/25/2015																									

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

<p>LEGEND</p> <p>Planned Actions</p> <p> In-Progress Actions</p> <p> Completed Actions</p>

Foliage Penetration Technology Evaluation Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 14												FY 15											
				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	1/14/2014	1/14/2014	1/14/2014					Jan 14th																			
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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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

Standoff Weapons Defeat IPT Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 14				FY 15				FY 16															
				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
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)																										

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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	FY 12				FY 13				FY 14							
				Q3		Q4		Q1		Q2		Q3		Q4					
				A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
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																

USNORTHCOM MA WG

Limited User Test/USFF JTTP Working Group lead pending

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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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LEGEND

Planned Actions

In-Progress Actions

Completed Actions




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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																																					
SORN Legal Review	10/01/2013	1/31/2014																																					
CE CONOPS Legal/Privacy Review	05/29/2013	04/09/2014																																					

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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	FY 13				FY 14				FY 15															
				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
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																										

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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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					
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
Phase 1 (Planning Phase)																							
Preliminary Design																							
Critical Design																							
Prototype Production																							
Prototype Testing																							
Design Revision																							
System Fabrication																							
Test & Evaluation																							
System Turnover																							

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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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						
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
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)
 - *Please use this format. Minor changes acceptable (i.e. annotations)

- Metrics**
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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P162 / <i>Nuclear and Conventional Physical Security</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Intregated Ground Security, Surveillance and Response Capability</i>				
Intregated Ground Security, Surveillance and Response Capability	1	2014	2	2015
<i>Secure Transportable Maintenance System Safe Internal Delay Capability</i>				
Secure Transportable Maintenance System Safe Internal Delay Capability	1	2014	4	2015
<i>PNAF Transport Container</i>				
PNAF Transport Container	1	2014	1	2015
<i>Defense Installation Access Control</i>				
Defense Installation Access Control	1	2014	4	2014
<i>Continuous Evaluation Concept Demonstration</i>				
Continuous Evaluation Concept Demonstration	1	2014	4	2014
<i>Defense Security Enterprise Architecture</i>				
Defense Security Enterprise Architecture	1	2014	2	2015
<i>Mission Assurance, Threat Alert, Disaster Resiliency and Response</i>				
Mission Assurance, Threat Alert, Disaster Resiliency and Response	1	2014	4	2014
<i>Navy Spike Weapon System EO Seeker Upgrade</i>				
Navy Spike Weapon System EO Seeker Upgrade	1	2014	4	2014
<i>Standoff Weapons Defeat IPT</i>				
Standoff Weapons Defeat IPT	1	2014	4	2015
<i>Radar Assisted Area Protection</i>				
Radar Assisted Area Protection	1	2014	4	2014
<i>Foliage Penetration Technology Evaluation</i>				

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P162 / <i>Nuclear and Conventional Physical Security</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Foliage Penetration Technology Evaluation	1	2014	2	2015
<i>Marine Mammal Enhanced Interdiction</i>				
Marine Mammal Enhanced Interdiction	1	2014	3	2015
<i>Marine Mammal Vigilance Localization</i>				
Marine Mammal Vigilance Localization	1	2014	4	2014
<i>Integrated Waterside Security – Concept Demonstration</i>				
Integrated Waterside Security – Concept Demonstration	1	2014	4	2014
<i>Ground-Based Operational Surveillance System (Expeditionary)</i>				
Ground-Based Operational Surveillance System (Expeditionary)	1	2014	4	2015
<i>Missile Field Defense Force Command, Control,</i>				
Missile Field Defense Force Command, Control,	1	2014	2	2015

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P041: CNT Rad/Nuc Passive Defense ADC&P	-	1.927	-	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: CNT Rad/Nuc Passive Defense	1.927	-	-
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 2014 Accomplishments: Developed Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)			
Accomplishments/Planned Programs Subtotals	1.927	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P041 / <i>CNT Rad/Nuc Passive Defense ADC&P</i>

C. Other Program Funding Summary (\$ in Millions)




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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

Radiological Detection System (RDS) Milestones

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
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

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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LEGEND	
	Planned Actions
	In-Progress Actions
	Completed Actions

Joint Personal Dosimeter (JPD) Milestones

Milestones	Baseline Date	Current Date	Completed Date	FY 13				FY 14				FY 15 (cont'd next slide)																							
				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								
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

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P041 / <i>CNT Rad/Nuc Passive Defense ADC&P</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Radiological Detection System</i>				
Radiological Detection System	1	2014	2	2019
<i>Joint Personal Dosimeter</i>				
Joint Personal Dosimeter	4	2014	1	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P040: National Technical Nuclear Forensics Systems	-	21.428	12.469	3.351	-	3.351	3.568	6.977	7.192	7.337	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 sensors and Particulate Airborne Collection Systems to provide timely and accurate information to national leadership in the area of Nuclear Forensics.

Per DoDI 2060.04 OSD AT&L NCB is the program lead for the Department of Defense in Nuclear Forensics. NCB represents DoD interests in all areas of nuclear forensics but focuses heavily on 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 2014	FY 2015	FY 2016
Title: National Technical Nuclear Forensics Systems	21.428	12.469	3.351
Description: Advanced development of ground based diagnostic and collection systems. This next generation technology will provide new information that increases accuracy and provides an improved timeline in support of senior leadership decision making.			
FY 2014 Accomplishments:			
<ul style="list-style-type: none"> • Developed a Particulate Airborne Collection System that allows additional airborne sampling flexibility to reduce the risk in providing samples for the forensics process • Installed, tested and integrated a ground based Prompt Diagnostic systems in various key metropolitan areas 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P040 / <i>National Technical Nuclear Forensics Systems</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Developed a Gaseous Airborne Collection System that provides the Department of Defense with mobile nuclear air sampling capability to support collection requirements for treaty verification and National Technical Nuclear Forensics. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Finalize the installation, testing, and operational support and integration of ground based Prompt Diagnostic systems in various key metropolitan areas Continue to develop a Gaseous Airborne Collection System that provides the Department of Defense with mobile nuclear air sampling capability to support collection requirements for treaty verification and National Technical Nuclear Forensics. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Finalize the development of a Gaseous Airborne Collection System that provides the Department of Defense with mobile nuclear air sampling capability to support collection requirements for treaty verification and National Technical Nuclear Forensics. 			
Accomplishments/Planned Programs Subtotals	21.428	12.469	3.351

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015




Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P040 / <i>National Technical Nuclear Forensics Systems</i>
--	--	--

Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DISCREET OCULUS	Sub Allot	Defense Threat Reduction Agency : Ft. Belvoir, VA	-	12.500		6.000		-		-		-	-	-	-
Modular Whole Air Collection System	Sub Allot	Air Force Technical Applications Center : Patrick AFB, FL	-	0.750		0.678		-		-		-	-	-	-
Particular Airborne Collection System	Sub Allot	Air Force Technical Applications Center : Patrick AFB, FL	-	5.271		5.791		-		-		-	-	-	-
Gobal Initiative Information Portal	IA	Department of State : Washington, DC	-	0.656		-		-		-		-	-	-	-
SOCOM Render Safe	Various	Multiple performers : Multiple locations	-	1.951		-		-		-		-	-	-	-
Airborne Radiation Detection, Identification and Measurement Systems	Sub Allot	Joint Product Manager - Rad / Nuc Defense : Aberdeen, MD	-	-		-		3.351		-		3.351	-	-	-
Subtotal			-	21.128		12.469		3.351		-		3.351	-	-	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Nuclear Testing, Diagnostics, Forensics and Stockpile Stewardship Course	IA	Lawrence Livermore National Laboratory : Livermore, CA	-	0.300		-		-		-		-	-	-	-
Subtotal			-	0.300		-		-		-		-	-	-	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 & Deploy DISCREET OCULUS Sensor Systems in Washington DC and New York, NY

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
Washington DC installation Complete	Dec 30, 2014	Dec 30, 2014																									
New York installation Complete	April 30, 2016	April 30, 2016																									

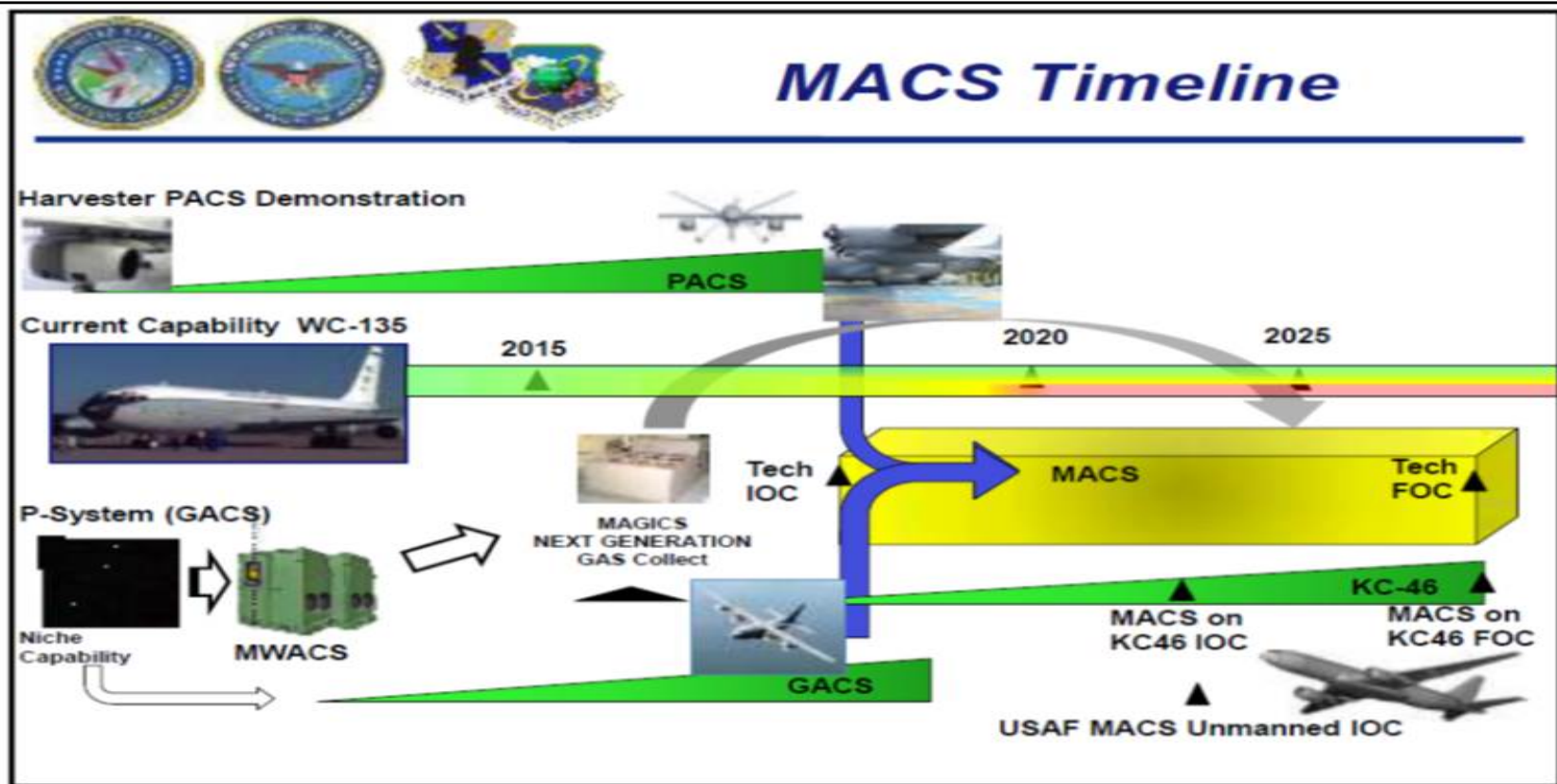
- PSEP Milestones:**
- Completion of major phases, task items, or deliverables
 - Decision/kill points, performance reviews, etc.
 - Demonstrations/Events (Please provide start/end dates as depicted)
 - *Please use this format. Minor changes acceptable (i.e. annotations)

- 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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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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



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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P040 / <i>National Technical Nuclear Forensics Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>DISCREET OCULUS</i>				
DISCREET OCULUS	1	2014	3	2016
<i>Harvester Particulate Airborne Collection System</i>				
Harvester Particulate Airborne Collection System	1	2014	1	2016
<i>Modular Whole Air Collection System</i>				
Modular Whole Air Collection System	1	2014	1	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603527D8Z / <i>Retract Larch</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	39.320	18.625	-	-	-	-	-	-	-	-	Continuing	Continuing
P527: <i>Retract Larch</i>	39.320	18.625	-	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	19.139	-	-	-	-
Current President's Budget	18.625	-	-	-	-
Total Adjustments	-0.514	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.514	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
0400 / 4					PE 0603527D8Z / <i>Retract Larch</i>				P527 / <i>Retract Larch</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P527: <i>Retract Larch</i>	39.320	18.625	-	-	-	-	-	-	-	-	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.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2014	FY 2015	FY 2016
Title: Retarct Larch	18.625	-	-
Articles:	-	-	-
Description: Not applicable. Information Classified			
FY 2014 Accomplishments: Not applicable. Information Classified			
Accomplishments/Planned Programs Subtotals	18.625	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not Applicable. Classified

E. Performance Metrics

Not Applicable. Classified

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603527D8Z / <i>Retract Larch</i>	Project (Number/Name) P527 / <i>Retract Larch</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Retrach Larch	C/BA	Unspecified : Unspecified	39.320	18.625		-		-		-		-	-	57.945	-
Subtotal			39.320	18.625		-		-		-		-	-	57.945	-

Remarks
N/A Details are classified.

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	39.320	18.625	-	-	-	-	-	57.945	-

Remarks
N/A Details are classified.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0603527D8Z / <i>Retract Larch</i>	P527 / <i>Retract Larch</i>

(U) PE 0603527D8Z, RETRACT LARCH

(U) The schedule is classified at Top Secret//Special Access Required. It is presented in the FY2016 Annual Report to Congress per US Code Title 10, Section 119. Further information can be obtained by appropriately accessed personnel from the Director, Special Programs, OUSD AT&L, (703) 697-1282.

No funds are requested for this Program Element in FY2016

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603527D8Z / <i>Retract Larch</i>	Project (Number/Name) P527 / <i>Retract Larch</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Retarch Larch</i>				
Retarch Larch	1	2014	1	2014

Note

N/A Classified

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	260.518	63.988	90.558	90.567	-	90.567	86.990	91.807	97.336	98.666	Continuing	Continuing
600: WALKOFF	260.518	63.988	90.558	90.567	-	90.567	86.990	91.807	97.336	98.666	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Classified, Special Access Program.

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	63.763	90.558	88.324	-	88.324
Current President's Budget	63.988	90.558	90.567	-	90.567
Total Adjustments	0.225	-	2.243	-	2.243
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	2.000	-			
• SBIR/STTR Transfer	-1.775	-			
• Departmental Adjustment	-	-	2.243	-	2.243

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: WALKOFF	63.988	90.558	90.567
FY 2014 Accomplishments: Classified, Special Access Program.			
FY 2015 Plans: Classified, Special Access Program.			
FY 2016 Plans: Classified, Special Access Program.			
Accomplishments/Planned Programs Subtotals	63.988	90.558	90.567

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense Date: February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603600D8Z / WALKOFF
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D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
Classified, Special Access Program.

F. Performance Metrics
Classified, Special Access Program.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0603600D8Z / <i>WALKOFF</i>	600 / <i>WALKOFF</i>

Remarks
Classified, Special Access Program.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603600D8Z / WALKOFF	Project (Number/Name) 600 / WALKOFF
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FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
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

<i>Classified, Special Access Program.</i>	
Classified, Special Access Program.	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603600D8Z / WALKOFF	Project (Number/Name) 600 / WALKOFF
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Classified, Special Access Program.</i>				
Classified, Special Access Program.	1	2014	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603714D8Z I <i>Advanced Sensors Applications Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	53.705	19.190	19.490	15.900	-	15.900	16.470	17.369	18.451	18.700	Continuing	Continuing
714: <i>Advanced Sensors Applications Program</i>	53.705	19.190	19.490	15.900	-	15.900	16.470	17.369	18.451	18.700	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program focuses on continued development of domestic technologies to support the assessment of foreign technologies that have demonstrated potential. In coordination with an international partner, unique and innovative approaches are used to expand the performance envelopes. This program supports military requirements identified in Joint Vision 2020, the Defense Science and Technology Strategy, the Anti-Submarine Warfare (ASW) Initial Capabilities Document and the Fleet ASW Integrated Prioritized Capability List.

B. Program Change Summary (\$ in Millions)	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	19.190	15.518	15.941	-	15.941
Current President's Budget	19.190	19.490	15.900	-	15.900
Total Adjustments	-	3.972	-0.041	-	-0.041
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	3.972			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-	-	-0.041	-	-0.041

C. Accomplishments/Planned Programs (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>
Title: Advanced Sensors Applications Program	19.190	19.490	15.900
FY 2014 Accomplishments: Provided Mission Support (Details provided in Defense-Wide classified book).			
FY 2015 Plans: Will provide Mission Support (Details provided in Defense-Wide classified book).			
FY 2016 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603714D8Z / <i>Advanced Sensors Applications Program</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Continue to provide Mission Support (Details provided in Defense-Wide classified book).			
Accomplishments/Planned Programs Subtotals	19.190	19.490	15.900

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense												Date: February 2015				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
0400 / 4				PE 0603714D8Z / Advanced Sensors Applications Program				714 / Advanced Sensors Applications Program								
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Technology Development - Civilian Pay	Sub Allot	Navy : N/A	10.716	5.419		5.400		5.528		-		5.528	Continuing	Continuing	Continuing	
Subtotal			10.716	5.419		5.400		5.528		-		5.528	-	-	-	
Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Government Facilities, Platforms & Agencies	Sub Allot	Various : Various	20.192	1.153		2.122		2.200		-		2.200	Continuing	Continuing	Continuing	
Subtotal			20.192	1.153		2.122		2.200		-		2.200	-	-	-	
Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
FFRDC Field Tests	FFRDC	Various : Various	0.596	0.494		0.500		0.500		-		0.500	Continuing	Continuing	Continuing	
R&D Prototyping - Contracted	Sub Allot	Various : Various	22.201	12.121		11.465		7.669		-		7.669	Continuing	Continuing	Continuing	
Subtotal			22.797	12.615		11.965		8.169		-		8.169	-	-	-	
Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Materials & Fees	FFRDC	CECOM : Aberdeen Proving Ground, MD	0.000	0.003		0.003		0.003		-		0.003	Continuing	Continuing	Continuing	
Subtotal			0.000	0.003		0.003		0.003		-		0.003	-	-	-	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense								Date: February 2015			
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0603714D8Z / <i>Advanced Sensors Applications Program</i>				Project (Number/Name) 714 / <i>Advanced Sensors Applications Program</i>				
	Prior Years	FY 2014	FY 2015		FY 2016 Base	FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	53.705	19.190	19.490		15.900	-		15.900	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603714D8Z / <i>Advanced Sensors Applications Program</i>	Project (Number/Name) 714 / <i>Advanced Sensors Applications Program</i>

FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
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

Airborne Sensors	
Continue Test and Evaluation	
Decision Milestone Report	
Phenomenology	
Continue Modeling and Testing	
Continue Technical Reviews (Bi-Quarterly)	
Continue Science Reviews (Annually)	
Oceanographic Measurements	
Continue Test and Evaluation	
Decision Milestone Report	
Extended Altitude Effects	
Continue Data Processing (Archive Data)	
Continue Data Collection and Analysis	
Fabricate/ Install	
Test and Evaluation	
Decision Milestone Report	
Joint Oversight Committee Review	
Continue Joint Oversight Committee Review (3rd Quarter each year)	
ASAP Web-Based Information	
Continue ASAP Web-Based Information (4th Quarter each year)	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603714D8Z / <i>Advanced Sensors Applications Program</i>	Project (Number/Name) 714 / <i>Advanced Sensors Applications Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Airborne Sensors</i>				
Continue Test and Evaluation	1	2014	4	2018
Decision Milestone Report	1	2016	3	2019
<i>Phenomenology</i>				
Continue Modeling and Testing	1	2014	4	2020
Continue Technical Reviews (Bi-Quarterly)	1	2014	4	2020
Continue Science Reviews (Annually)	1	2014	4	2020
<i>Oceanographic Measurements</i>				
Continue Test and Evaluation	1	2014	3	2019
Decision Milestone Report	1	2016	1	2019
<i>Extended Altitude Effects</i>				
Continue Data Processing (Archive Data)	1	2014	2	2016
Continue Data Collection and Analysis	1	2014	4	2018
Fabricate/ Install	1	2015	4	2018
Test and Evaluation	1	2016	4	2020
Decision Milestone Report	1	2019	4	2020
<i>Joint Oversight Committee Review</i>				
Continue Joint Oversight Committee Review (3rd Quarter each year)	3	2014	3	2020
<i>ASAP Web-Based Information</i>				
Continue ASAP Web-Based Information (4th Quarter each year)	4	2014	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 0603851D8Z I Environmental Security Technology Certification Program
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	129.836	64.756	63.871	52.758	-	52.758	54.496	57.807	62.259	63.074	Continuing	Continuing
P514: Environmental Security Technology Certification Program	129.836	64.756	63.871	52.758	-	52.758	54.496	57.807	62.259	63.074	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	66.453	51.462	52.190	-	52.190
Current President's Budget	64.756	63.871	52.758	-	52.758
Total Adjustments	-1.697	12.409	0.568	-	0.568
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	12.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-0.091			
• SBIR/STTR Transfer	-1.697	-			
• Program Adjustments	-	-	0.568	-	0.568

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P514: Environmental Security Technology Certification Program	129.836	64.756	63.871	52.758	-	52.758	54.496	57.807	62.259	63.074	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 2014	FY 2015	FY 2016
Title: Environmental Technology Demonstration/Validation	33.604	35.236	28.415
<p>Description: Funds are programmed for investments in projects that address priority DoD environmental requirements. The focus of the program is on live site 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.</p> <p>FY 2014 Accomplishments: Funds were invested in projects that address priority DoD environmental requirements. Focused new investment topics for FY 2014 included: 1) Remediation of Contaminated Groundwater; 2) In Situ Management of Contaminated Sediments; 3) Airfield Natural Resources Management to Reduce Bird Air-Strike Hazard (BASH) Threats; 4) Wastewater Treatment at DoD Facilities; and 5) Military Munitions Detection, Discrimination, and Remediation. Funding in FY 2014 also supports live site UXO demonstrations. This effort 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.</p> <p>FY 2015 Plans: Funds are planned for continued investment in projects that address priority DoD environmental requirements. New investment topics for FY 2015 include: 1) Remediation of Contaminated Groundwater; 2) In Situ Management of Contaminated Sediments;</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603851D8Z / <i>Environmental Security Technology Certification Program</i>	Project (Number/Name) P514 / <i>Environmental Security Technology Certification Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
3) Characterization, Control, and Treatment of Range Contamination; and 4) Military Munitions Detection, Discrimination, and Remediation. FY 2016 Plans: Funds are planned for continued investment in projects that address priority DoD environmental requirements.				
Title: Energy Technology Demonstration/Validation Description: Funds are programmed for investments in projects that respond 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 for reduced energy consumption and improved energy security on its installations while reducing energy and operational costs. FY 2014 Accomplishments: Funds were invested in energy projects that constitute the Installation Energy Test Bed Initiative. The 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 DoD test bed program exploits the Department's existing built infrastructure to test energy efficiency and renewable energy technologies. In FY 2014 ESTCP solicited proposals in two areas: 1) Smart and Secure Military Installation Energy Management and 2) Advanced Building Energy Management and Control. It is a distributed test bed designed to evaluate energy technologies under the varied climatic conditions and building types DoD manages. The test beds 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. This process has been developed, piloted, and validated through previous Congressional funding. Information on existing demonstrations can be found at www.serdp-estcp.org . FY 2015 Plans: Funds are planned to continue investments in energy and water projects that constitute the Installation Energy Test Bed Initiative. FY 2016 Plans: Funds are planned to continue investments in energy and water projects that constitute the Installation Energy Test Bed Initiative.		31.152	28.635	24.343
Accomplishments/Planned Programs Subtotals		64.756	63.871	52.758
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603851D8Z / <i>Environmental Security Technology Certification Program</i>	Project (Number/Name) P514 / <i>Environmental Security Technology Certification Program</i>

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603851D8Z / <i>Environmental Security Technology Certification Program</i>	Project (Number/Name) P514 / <i>Environmental Security Technology Certification Program</i>
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ID	Task Name	Duration	Start	Finish	Predecessors	2014				2015				2016		
						Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2
1	FY 2014 In Progress Reviews	174 days?	Tue 10/1/13	Fri 5/30/14		[Task Bar]										
2	Develop FY 2015 Program	218 days?	Wed 1/1/14	Fri 10/31/14			[Task Bar]									
3	FY 2015 In-Progress Reviews	173 days?	Wed 10/1/14	Fri 5/29/15					[Task Bar]							
4	Develop FY 2016 Program	217 days?	Thu 1/1/15	Fri 10/30/15						[Task Bar]						
5	FY 2016 In-Progress Reviews	172 days?	Thu 10/1/15	Fri 5/27/16								[Task Bar]				

Project: ESTCP R-4 Date: Mon 7/21/14	Task	Milestone	External Tasks
	Split	Summary	External Milestone
	Progress	Project Summary	Deadline

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603851D8Z / <i>Environmental Security Technology Certification Program</i>	Project (Number/Name) P514 / <i>Environmental Security Technology Certification Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>In Progress Reviews</i>				
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
<i>Develop Program</i>				
Develop FY 2015 Program	1	2014	4	2014
Develop FY 2016 Program	1	2015	4	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603920D8Z I <i>Humanitarian De-mining</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	26.281	11.395	10.180	10.129	-	10.129	10.451	10.976	11.600	11.744	Continuing	Continuing
920: <i>Humanitarian De-mining</i>	26.281	11.395	10.180	10.129	-	10.129	10.451	10.976	11.600	11.744	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 172 evaluations in 37 countries, including Vietnam, Cambodia, Solomon Islands, Iraq and Afghanistan. The program's technologies have cleared 26 million sq meters of the world's toughest minefields; found or destroyed 133,000 mines and UXO; and provided 350,000 mine/UXO disposal charges with 40 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 held by OASD SO/LIC. The Requirements Workshop involves 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603920D8Z I <i>Humanitarian De-mining</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	11.688	10.194	9.192	-	9.192
Current President's Budget	11.395	10.180	10.129	-	10.129
Total Adjustments	-0.293	-0.014	0.937	-	0.937
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.288	-			
• Other Adjustments	-0.005	-0.014	0.937	-	0.937

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Title: 0603920D8Z - SO/LIC Humanitarian De-mining	11.395	10.180	10.129
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/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 2014 Accomplishments: In FY14 the HD R&D Program's technologies cleared 4.1 million square meters of the world's toughest minefields and UXO threat areas, removing or destroying 7,378 mines and 22,970 UXO. The HD R&D Program completed ongoing equipment developments/modifications and continued operational evaluations from FY2013. The HD R&D program also continued to support 51 on-going operational field evaluations in 11 countries. New evaluations included the Raptor II and Rotary Mine Comb to Afghanistan; the Mine Clearing Loader to Chile; the Rebel Crusher to Iraq; the Riddle soil sifting bucket to Vietnam; the Wolverine and Quadcopter to Thailand; and the Quadcopter, Tamina, Piranha and Bearcat to Cambodia. The HD R&D Program supported the combatant commands and Embassy staffs by conducting site surveys and country assessments. The program developed and tested twelve prototype technologies in the following areas: technical survey, individual mine/UXO and minefield detection, mechanical mine/UXO and vegetation clearance, mine neutralization, and post-clearance quality control (QC).			
FY 2015 Plans: The HD R&D Program will deploy new technology to several countries, including the Mini MineWolf and Handheld Standoff Mine Detection System in Zimbabwe; Six-Tine Rotary Mine Comb in Afghanistan; Minehound, Sparrow, Delta and Minefield			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603920D8Z I <i>Humanitarian De-mining</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Management System in Cambodia; Empact in Laos; Wet Soil Sifting System in Solomon Islands; Severe Terrain Support Vehicle in Marshall Islands; Rex in Angola; and Target Reacquisition Positioning System in West Bank. The program element will continue to support ongoing FY2014 operational field evaluations and will support the combatant commands and Embassy staffs by conducting site surveys or country assessments. The program will 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).</p> <p>FY 2016 Plans: The HD R&D Program will complete ongoing equipment developments/modifications, and continue operational evaluations from FY2015. The HD R&D will support the combatant commands and Embassy staffs by conducting new site surveys or country assessments. The program will 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 quality assurance (QA).</p>			
Accomplishments/Planned Programs Subtotals	11.395	10.180	10.129

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 items 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).

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 2014 Target:

90% of currently funded research technologies are completed on time and within budget

Complete scheduled R&D project tasks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603920D8Z / <i>Humanitarian De-mining</i>	
Transition field-ready technologies to host nation demining partners		
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 Conduct biennial Humanitarian R&D Program Requirements Workshop		
Basis of FY 2014 to Date 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, HDTTC, 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.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / Humanitarian De-mining	Project (Number/Name) 920 / Humanitarian De-mining
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware Development	Various	RDECOM-NVESD : Ft Belvoir, VA	14.177	7.735		6.920		6.894		-		6.894	-	-	-
Subtotal			14.177	7.735		6.920		6.894		-		6.894	-	-	-

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 Countermining mission area.

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Humanitarian Demining Research and Development Program	Various	RDECOM-NVESD : Ft Belvoir, VA	11.228	3.210		2.858		2.834		-		2.834	-	-	-
Subtotal			11.228	3.210		2.858		2.834		-		2.834	-	-	-

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 countermining R&D and next generation HD technology developments while directly contributing to world-wide mine and UXO clearance.

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Humanitarian Demining Program Management Support	Various	RDECOM-NVESD : Ft Belvoir, VA	0.876	0.450		0.402		0.401		-		0.401	-	-	-
Subtotal			0.876	0.450		0.402		0.401		-		0.401	-	-	-

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 Countermining mission area. Areas of emphasis are identified and validated at a

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / Humanitarian De-mining	Project (Number/Name) 920 / Humanitarian De-mining
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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract			
Project Cost Totals				26.281	11.395	10.180	10.129	-	10.129	-	-	-	-	-	-

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 countermining 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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / Humanitarian De-mining	Project (Number/Name) 920 / Humanitarian De-mining
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	FY14				FY15				FY16				FY17				FY18				FY19				FY20							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Mine / UXO Detection Systems																																
Market Research	■																															
Contract Awards	■																															
Develop Prototype Equipment		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Technical Evaluation		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Initiate New Operational Field Evaluations			■	■			■	■			■	■			■	■			■	■			■	■			■	■			■	■
Continuing Detection Operational Field Evals	■																															
Program Reviews		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
Requirements Workshop			▲				▲				▲				▲				▲				▲				▲				▲	
Country/OFE Site Assessments	■				■				■				■				■				■				■				■			
Mechanical Mine / UXO Clearance Systems																																
Market Research	■																															
Modify/Integrate/Assemble COTS Equipment	■																															
Design Mods (armor, RC, interfaces)		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Fabricate Demining Equipment		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Component Integration		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Technical Evaluation		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■		■	■	■
Initiate New Operational Field Evaluations			■	■			■	■			■	■			■	■			■	■			■	■			■	■			■	■
Continuing Clearance Operational Field Evals	■																															
Program Reviews		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲		▲
Requirements Workshop			▲				▲				▲				▲				▲				▲				▲				▲	
UXO Working Group Meeting																																
Country/OFE Site Assessments	■				■				■				■				■				■				■				■			

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603920D8Z / <i>Humanitarian De-mining</i>	Project (Number/Name) 920 / <i>Humanitarian De-mining</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Mechanical Mine/UXO Clearance Systems	1	2014	4	2020
Mine/UXO Detection Systems	1	2014	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	21.948	9.597	10.125	10.350	-	10.350	10.432	10.910	11.204	11.353	Continuing	Continuing
P923: <i>Coalition Warfare</i>	21.948	9.597	10.125	10.350	-	10.350	10.432	10.910	11.204	11.353	Continuing	Continuing

A. Mission Description and Budget Item Justification

Current U.S. military strategy and the global security environment make coalition warfare and multinational operations 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. U.S. strategic guidance confirms that coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

The Coalition Warfare Program (CWP) responds to this guidance by supporting 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. 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 fourteen-year history, CWP has leveraged \$4 of foreign partner funding 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	9.827	10.139	10.420	-	10.420
Current President's Budget	9.597	10.125	10.350	-	10.350
Total Adjustments	-0.230	-0.014	-0.070	-	-0.070
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.005	-0.014			
• SBIR/STTR Transfer	-0.225	-			
• Baseline program adjustments	-	-	-0.070	-	-0.070

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>
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Change Summary Explanation

Program baseline reduced minimally to fund other department priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>				Project (Number/Name) P923 / <i>Coalition Warfare</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P923: <i>Coalition Warfare</i>	21.948	9.597	10.125	10.350	-	10.350	10.432	10.910	11.204	11.353	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Current U.S. military strategy and the global security environment make coalition warfare and multinational operations 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. U.S. strategic guidance confirms that coalitions and relationships with international partners are high priorities for the nation and the Department of Defense.

The Coalition Warfare Program (CWP) responds to this guidance by supporting 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. 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 thirteen-year history, CWP has leveraged \$4 of foreign partner funding for every \$1 of U.S. Government investment, 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 2014	FY 2015	FY 2016
Title: Previous Year Continuing Projects	8.233	4.703	0.668
Description: Program provided additional funding to projects that began in earlier selection cycles.			
FY 2014 Accomplishments: Continued efforts that will result in delivery of: a new fast running model for blast propagation through failing blast doors in tunnels; a micro-scale vibrational energy harvester capable of operating at low frequency; new body armor design with enhanced protection; and a GPS anti-jam antenna system for submarines.			
FY 2015 Plans: Continuation of efforts that will result in delivery of: improved radar modeling capability; software tool to improve real-time communications connectivity in urban settings; and GPS anti-jam algorithms for operation in a fast rotor environment.			
FY 2016 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Completion of efforts that will improve submarine force network interoperability, deliver a prototype for standoff detection of explosives, and optimize algorithms and provide numerical tools used for design and performance assessment of multi-hull naval ships.				
<p>Title: Allied Munitions Detection - Underwater Initiative</p> <p>Description: Bilateral US Navy project to evaluate, analyze and advance technologies and techniques for the detection, classification and mapping of bottom and buried underwater munitions and mines for the development of an automated unmanned and autonomous underwater survey system.</p> <p>FY 2015 Plans: Data analysis, algorithm improvement, and sea trial.</p> <p>FY 2016 Plans: Data analysis from first sea trial, system analysis and improvements, and sea trial.</p>		-	0.607	0.773
<p>Title: Disposable Chem-Bio Identification Technology</p> <p>Description: Bilateral US Army project to develop, characterize, and prototype a low-cost, highly accurate chemical-biological identification and diagnostics capability using a novel commercial paper-based sensing technology.</p> <p>FY 2015 Plans: Develop signature library and initial color-change algorithm; develop and procure materials for testing.</p> <p>FY 2016 Plans: Continue to develop color-change algorithm(s); integrate chemical algorithm with biological algorithm; engineer, design, and manufacture/integrate prototype; develop prototype software; evaluate prototype in an operationally realistic environment and in the field; publish final reports and technical data package.</p>		-	0.136	0.374
<p>Title: Enhanced Ultraviolet Photodiodes for Biological Aerosol Sensors</p> <p>Description: US Army project to develop and test enhanced UV photodiode modules in US and ROK biological aerosol sensors.</p> <p>FY 2014 Accomplishments: Consultated on design and fabrication of silicon photodiode .</p> <p>FY 2015 Plans: Design, fabrication, and testing of photodiodes.</p> <p>FY 2016 Plans:</p>		0.050	0.404	0.323

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Refinement and additional testing of photodiodes.			
<p>Title: Enhanced Unmanned Underwater Mine Neutralization Capability</p> <p>Description: Bilateral US Navy project to develop and test autonomous mine neutralization behaviors, target (mine) recognition and image enhancement in reduced visibility conditions, in order to enable autonomous mine neutralization.</p> <p>FY 2015 Plans: Develop target recognition capabilities and port algorithms to test bed.</p> <p>FY 2016 Plans: Develop image enhancement capabilities, integrate components, and conduct joint trial.</p>	-	0.320	0.320
<p>Title: Hypertemporal Imaging (HTI) Field Trials for Dim Target Detection</p> <p>Description: Bilateral US Air Force project to perform realistic trials of a novel target detection technology that would lead to the production of a HTI Technology concept of operations in support of missile warning and battlespace awareness.</p> <p>FY 2015 Plans: Hardware purchase and test site scouting.</p> <p>FY 2016 Plans: Hardware purchase and field testing.</p>	-	0.480	0.470
<p>Title: Eye Safer Laser for Directed Energy</p> <p>Description: Bilateral US Navy project to develop eye safer lasers for directed energy laser weapons.</p> <p>FY 2015 Plans: Design and fabrication of laser fiber structure.</p> <p>FY 2016 Plans: Design optimization and fiber laser testing.</p>	-	0.650	0.850
<p>Title: Microbial Fuel Cells (MFC) as Underwater Power Enablers for Sensors</p> <p>Description: Bilateral US Navy project to develop an MFC system for increased underwater power to sensors in marine environments.</p> <p>FY 2015 Plans: Incorporate materials and conduct laboratory demonstration.</p> <p>FY 2016 Plans:</p>	-	0.200	0.530

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Evaluate system and conduct prototype operationally relevant testing. Title: Monitoring and Controlling Multiple Assets within Complex Environments Description: Bilateral US Navy project to develop human-machine interface software prototypes and specifications to enable safe and effective unmanned air system operations. FY 2015 Plans: Scenario development and evaluation of interface alternatives FY 2016 Plans: Modify and test prototypes.	-	0.400	0.350
Title: Multispectral Augmented Visually Enhanced Reality Imaging Capability Description: Bilateral US Special Operations Command project to research, develop, and test a multispectral capability for enhanced situational awareness and long-range target acquisition. FY 2014 Accomplishments: Performed analysis and technology assessment. FY 2015 Plans: Hardware development. FY 2016 Plans: Operational testing.	0.203	0.247	0.323
Title: Non-Lethal Maritime Vessel Disablement Description: Bilateral US Navy project to develop the materials and mechanisms for a distinct tactical delivery system of non-lethal solutions for maritime vessel stopping/disabling. FY 2014 Accomplishments: Test support. FY 2015 Plans: Material refinement and large scale trials. FY 2016 Plans: Prototype refinement and testing.	0.070	0.456	0.457
Title: Periscope Vulnerability and Visualization Tactical Decision Aid	-	0.400	0.420

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Description: Bilateral US Navy project to produce a modern submarine vulnerability assessment tool.</p> <p>FY 2015 Plans: Conduct technical information exchanges and develop modeling approach.</p> <p>FY 2016 Plans: Demonstrate and refine software.</p>			
<p>Title: Project Selections</p> <p>Description: Program will conduct competitive nomination process to identify new projects.</p> <p>FY 2016 Plans: Projects selected based on COCOM, Service, Joint Staff, OSD, and DoD Agency priorities and requirements.</p>	-	-	3.421
<p>Title: Coalition Warfare Program (CWP) Support</p> <p>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.</p> <p>FY 2014 Accomplishments: Contractor provided management support of the CWP, attended RDT&E meetings and events, and monitored and managed ongoing projects' technical and financial performance.</p> <p>FY 2015 Plans: 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.</p> <p>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.</p>	0.521	0.591	0.541
<p>Title: Interoperability and Collaboration Initiatives</p>	0.520	0.531	0.530

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments: Program funded efforts aimed at building partnerships, improving U.S. interoperability with foreign partners, and improving collaborative project processes.</p> <p>FY 2015 Plans: Program funds efforts aimed at building partnerships, improving U.S. interoperability with foreign partners and improving collaborative project processes.</p> <p>FY 2016 Plans: Program will fund efforts aimed at building partnerships, improving U.S. interoperability with foreign partners and improving collaborative project processes.</p>			
Accomplishments/Planned Programs Subtotals	9.597	10.125	10.350

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Product Development Costs	Various	Various : Various	14.268	6.536		6.677		3.913		-		3.913	-	-	-
Subtotal			14.268	6.536		6.677		3.913		-		3.913	-	-	-

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Test and Evaluation Costs	Various	Various : Various	4.610	1.353		1.938		2.405		-		2.405	-	-	-
Subtotal			4.610	1.353		1.938		2.405		-		2.405	-	-	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Coalition Warfare Program Project Management Services Costs	Various	Various : Various	3.070	1.708		1.510		4.032		-		4.032	-	-	-
Subtotal			3.070	1.708		1.510		4.032		-		4.032	-	-	-

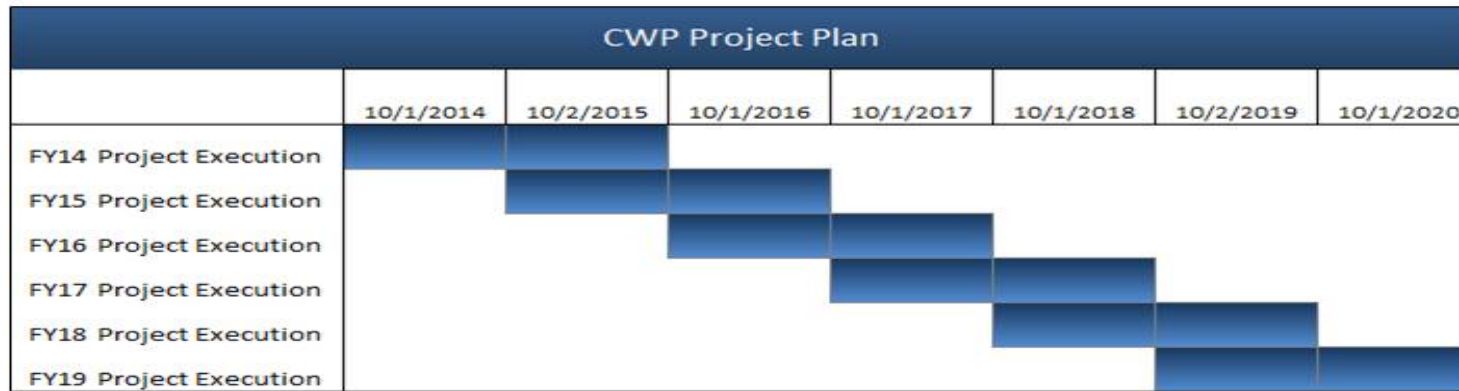
	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		21.948	9.597		10.125		10.350		-	10.350	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603923D8Z / <i>Coalition Warfare</i>	Project (Number/Name) P923 / <i>Coalition Warfare</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 CWP Project Execution	1	2014	4	2015
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	64.470	19.637	12.907	1.518	-	1.518	4.010	3.897	3.561	3.610	Continuing	Continuing
P015: <i>Corrosion Protection Projects</i>	64.470	19.637	12.907	1.518	-	1.518	4.010	3.897	3.561	3.610	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 a 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604016D8Z I <i>Department of Defense Corrosion Program</i>
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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	20.312	2.907	3.055	-	3.055
Current President's Budget	19.637	12.907	1.518	-	1.518
Total Adjustments	-0.675	10.000	-1.537	-	-1.537
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.675	-			
• Other Internal Baseline Adjustments	-	-	-1.537	-	-1.537

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: P015: *Corrosion Protection Projects*

Congressional Add: *Corrosion Control, Prevention and Prediction through Coatings, Materials and Maintenance R&D*

Congressional Add Subtotals for Project: P015

Congressional Add Totals for all Projects

	FY 2014	FY 2015
Congressional Add: <i>Corrosion Control, Prevention and Prediction through Coatings, Materials and Maintenance R&D</i>	16.325	-
Congressional Add Subtotals for Project: P015	16.325	-
Congressional Add Totals for all Projects	16.325	-

Change Summary Explanation

Baseline adjustment reflects funding for internal AT&L priorities and requirements.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	

NOTE: The FY 2016 funding request was reduced by \$1.521 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P015: Corrosion Protection Projects	64.470	19.637	12.907	1.518	-	1.518	4.010	3.897	3.561	3.610	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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	Project (Number/Name) P015 / <i>Corrosion Protection Projects</i>
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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 2014	FY 2015	FY 2016
<p>Title: Corrosion Prevention and Control Projects and Activities</p> <p>FY 2014 Accomplishments: Initiated the development and transition of mature corrosion control technologies for use by the Services (i.e., Army, Navy, Air Force) Published Weapon Systems and Equipment Corrosion Prevention and Control Guidebook Provided oversight of corrosion planning for ACAT I systems Completed impact of corrosion studies for Navy and USMC aviation and Air Force aircraft and missiles Reinstated MIL-STD-1568 Completed work on four (4) web-based training modules. Posted training on www.corrconnect.org Posted corrosion prevention and control guidance for facilities and infrastructure on Whole Building Design Guide website</p> <p>FY 2015 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; develop predictive capabilities Issue MIL-HDBK-1250 as non-governmental standards Develop non-governmental standard on "Corrosion Planning" for equipment and infrastructure Re-issue DoDI 5000.67 "Prevention and Mitigation of Corrosion on DoD Military Equipment and Infrastructure" Deploy major upgrade to Product Introduction Tool</p> <p>FY 2016 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; develop predictive capabilities Issue joint SSPC/NACE standard on Corrosion Planning</p>	3.312	12.907	1.518
Accomplishments/Planned Programs Subtotals	3.312	12.907	1.518

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015	
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	Project (Number/Name) P015 / <i>Corrosion Protection Projects</i>	
		FY 2014	FY 2015
<p>Congressional Add: Corrosion Control, Prevention and Prediction through Coatings, Materials and Maintenance R&D</p> <p>FY 2014 Accomplishments: Funded additional corrosion prevention and control (CPC) technology insertion projects:</p> <ul style="list-style-type: none"> a) Polyurethane gaskets for topside ship applications b) Geopolymer Nano-Ceramic Liner System c) Qualification of DiEthylene Glycol Mono-Methyl Ether (DiEGME) d) Advanced Corrosion Evaluation System (ACES) Validation and Testing on Family of Medium Tactical Vehicles (FMTV) e) Cleaning Mechanisms for Up Armored Vehicles f) Engineered Coatings for Fasteners g) Specification of Industrial Human Augmentation System for Corrosion Control h) Robotic Portable Dimensional Corrosion Repair for Aircraft i) Transition of Novel and Automated Nonskid Spray Equipment to the Regional Maintenance Centers j) Calcium Sulfonate Coating for Crevice Corrosion k) Chip Resistant Polyurethane High Build Coatings l) Rust and Mill Scale Remover m) Fuel Safe Insertable Stalk Inspection System (ISIS) Industrialization n) Polymer Concrete Pipe o) Zirconium Oxide Pretreatment p) Institutionalization of High Heat Resistant Coatings q) Durable Concrete Repairs <p>Continued execution of the Technology Corrosion Collaboration focusing on technologies to reduce the impact of corrosion on DoD equipment and infrastructure.</p> <ul style="list-style-type: none"> a) Expanded role of Services' subject matter experts in focusing research on DoD corrosion challenges b) Funded corrosion-related research and curriculum development at each of the Service Academies c) Held open call for research proposals and received 54 submissions; added Arizona State University and Southwest Research Institute for FY 2014 d) 72 graduate students supported – future core of the DoD corrosion community e) 56 scientific journal articles or technical reports published 		16.325	-
Congressional Adds Subtotals		16.325	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	Project (Number/Name) P015 / <i>Corrosion Protection Projects</i>
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 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.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Corrosion Policy and Oversight	MIPR	Various (Army, Navy, Air Force) : Various	63.242	16.634	Oct 2013	10.000		-		-		-	-	89.876	-
Subtotal			63.242	16.634		10.000		-		-		-	-	89.876	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Corrosion Policy and Oversight	MIPR	Logistics Management Institute : McLean, VA	1.228	1.729	Oct 2013	1.790	Oct 2014	-	Oct 2015	-		-	Continuing	Continuing	Continuing
Corrosion Policy and Oversight	MIPR	Decisive Analytics Corporation : Arlington, VA	0.000	1.274	Oct 2013	1.117	Oct 2014	1.518	Oct 2015	-		1.518	Continuing	Continuing	Continuing
Subtotal			1.228	3.003		2.907		1.518		-		1.518	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	64.470	19.637	12.907	1.518	-	1.518	-	-	-

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	Project (Number/Name) P015 / <i>Corrosion Protection Projects</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Corrosion Policy and Oversight</i>				
DoD 5000-Series Review	1	2014	4	2014
Integration of CPC and CPC-Related Policy	1	2014	1	2015
DAG Review	1	2014	4	2014
Corrosion Board of Directors	1	2014	4	2014
DoD Corrosion Prevention and Mitigation Strategic Plan	1	2014	1	2015
USC Engagement	1	2014	4	2014
GAO Engagement	1	2014	4	2014
Corrosion Technology Implementation Projects Support	1	2014	4	2014
Training Gap Analysis	1	2014	1	2015
Corrosion Website Sustainment	1	2014	1	2015
Product Introduction and Qualification Tool	1	2014	1	2015
Facilitate/Support Corrosion Events	1	2014	1	2015
International Corrosion Partnerships and Engagements	1	2014	4	2014
Programmatic Support	1	2014	4	2014
Technical Corrosion Collaboration	1	2014	4	2014
<i>Corrosion Technology Support</i>				
Corrosion Prevention and Control Review	1	2014	4	2014
DFARS Support	1	2014	4	2014
Funding Reviews	1	2014	4	2014
Weapon Systems and Infrastructure Oversight Support	1	2014	1	2015
Military Department Corrosion Program Review	1	2014	1	2015

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604016D8Z / <i>Department of Defense Corrosion Program</i>	Project (Number/Name) P015 / <i>Corrosion Protection Projects</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Corrosion Technology Implementation Project Reviews	1	2014	1	2015
Corrosion Subject Matter Experts	1	2014	4	2014

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					PE 0604250D8Z I <i>Advanced Innovative Technologies</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	125.811	174.752	469.798	-	469.798	422.206	104.195	-	-	Continuing	Continuing
P250: <i>Advanced Innovative Technologies</i>	0.000	125.811	174.752	469.798	-	469.798	422.206	104.195	-	-	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	129.883	190.000	76.000	-	76.000
Current President's Budget	125.811	174.752	469.798	-	469.798
Total Adjustments	-4.072	-15.248	393.798	-	393.798
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-15.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.061	-			
• SBIR/STTR Transfer	-4.011	-			
• Realignment for Higher Priority Programs	-	-	395.133	-	395.133
• FFRDC SEC 8104	-	-0.248	-	-	-
• Economic Assumptions	-	-	-1.335	-	-1.335

Change Summary Explanation

The program changes are threefold: a continuation of the Land-Based Rail Gun (LBRG) program which had two-year funding (FY 2014 and FY 2015); the

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense Date: February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604250D8Z / <i>Advanced Innovative Technologies</i>
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expansion of LBRG to include Land-based and Sea-based powder guns; and the addition of three new projects for SCO.

- 1) Funds are provided to both continue the LBRG efforts that began in FY 2014 and expand the program to include Land-based and Sea-based Powder Guns. This combined program will demonstrate closing the fire control loop between existing sensors and prototype projectiles launched from Railgun and existing powder guns, including Navy's Mk-45 five inch Naval gun and the Army's Paladin 155 millimeter (mm) self-propelled howitzer powder guns.
- 2) The Sea Dragon project will integrate an existing weapon system into an existing Navy platform to demonstrate a cost-effective offensive weapon system capability.
- 3) The Unmanned Aerial Vehicle (UAV) Payloads project will leverage existing low-cost payloads by integrating them with UAVs (e.g. micro-UAVs) capable of autonomous swarming behaviors.
- 4) The Sea Mob project, in partnership with the Office of Naval Research (ONR), will develop a group of Unmanned Surface Vehicles (USVs) capable of cooperative swarming behaviors.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604250D8Z / <i>Advanced Innovative Technologies</i>				Project (Number/Name) P250 / <i>Advanced Innovative Technologies</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P250: <i>Advanced Innovative Technologies</i>	-	125.811	174.752	469.798	-	469.798	422.206	104.195	-	-	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 2014	FY 2015	FY 2016
Title: Land-Based Rail Gun (LBRG) and Land-Based and Sea-Based Powder Guns	125.811	102.000	270.430
<p>Description: The title of Land-Based Rail Gun (LBRG) has been expanded to account for the inclusion of “Land-and-Sea-Based Powder Guns”, to further enhance base defense capabilities in this PE. The existing Navy Science and Technology (S&T) Sea-based Railgun program will be leveraged into LBRG and powder gun analysis, prototyping, and experimentation. Cost-effective, large magazine base defense will be demonstrated by closing the fire control loop between existing sensors and prototype projectiles launched from Railgun and existing powder guns including the Navy’s Mk-45 five inch Naval gun and the Army’s Paladin 155 mm self-propelled howitzer. To facilitate this, the program will integrate powder guns, the Railgun launcher, power, 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 from a 20 mega-joule (MJ) Railgun and powder gun, 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.</p>			
FY 2014 Accomplishments:			

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

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Initiated development of high fidelity models and simulations for gun launched guided projectile engagements. • Anchored projectile models with wind tunnel and flight test data in collaboration with the Navy’s Office of Naval Research (ONR). • Analyzed several effective sensor architectures using existing sensors to support gun launched guided projectile engagements. • Selected sensors to support FY 2014 flight tests of prototype projectile airframes. • Conducted several projectile airframe flight tests in collaboration with ONR. • Installed tracker hardware and successfully tracked a projectile flight with tactically relevant measurement accuracies in collaboration with ONR and the Army’s Armament Research Development and Engineering Center. • Tracked eight projectiles launched from a Mk-45 powder gun with multiple sensors including Northrop Grumman Ground/Air Task Oriented Radar (G/ATOR), Raytheon Improved Sentinel prototype radar, Raytheon Multi-Function RF System (MFRFS) radar, Technovative Applications’ interferometric radar, and a variety of electro-optical and infrared sensors at White Sands Missile Range (WSMR). • Proved launch survivability of projectile guidance and navigation electronics on four of four projectile launches from an Mk 45 powder gun at WSMR. • Updated projectile control actuation system requirements and design based on wind-tunnel and flight testing. • Established Systems Engineering Integrated Product Teams for Railgun Systems. • Accelerated procurement of updated control actuation systems from General Dynamic Ordnance and Tactical Systems (GD/OTS). • Continued high fidelity closed-loop fire control modeling and simulation with Naval Surface Warfare Center / Dahlgren Division (NSWC/DD), Missile and Space intelligence Center (MSIC), and John Hopkins University / Applied Physics Laboratory (JHU/APL). • Began procurement of 20 MJ Railgun launcher system (power and energy, launcher, cables, test stand, and launcher/power controls). • Began design of high power prototype Railgun mount with BAE. • Began procurement, based on successful testing, of two proof-of-principle fire control radars for fire control development and testing. • Began development of operational prototype fire control radar with Georgia Tech Research Institute (GTRI), to improve upon the proof-of-principle radars by incorporating existing active electronically scanned arrays. • Began hardware in the loop facility development at JHU/APL to test hardware and software prior to flight tests at lower cost and risk. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Fire three prototype projectiles from Mk-45 powder gun to test datalink under development by Sandia National Laboratories. • Complete a Railgun prototype mount analysis of alternatives review with BAE. • Complete fire control system requirements review, Preliminary Design Review (PDR), and Critical Design Review (CDR) to support FY 2016 tests. 			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Complete Railgun Mount PDR with BAE. • Complete system concept for integrated gun base defense (power, railgun, powder gun, fire control system, projectile, and sensor). • Conduct live-fire projectile launch from Army 155 mm powder gun. • Accelerate BAE hypervelocity projectile development and testing. • Modify Mk-160 software and integrate data link to enable closed loop fire control for testing of prototype projectiles from railgun and powder guns. • Test launch survivability of projectile, including control actuation system and data link from 32 MJ Railgun. • Test projectile control actuation system from GD/OTS. • Investigate and test alternative lethality methods. • Conduct hardware in the loop test of proof-of-principle fire control radars. • Take delivery of two proof-of-principle fire control radars. • Begin to receive and test pulsed power containers procured from BAE, General Atomics, and Raytheon. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Complete assembly and checkout of a 20 MJ Railgun at White Sands Missile Range (WSMR), including BAE supplied launcher and pulsed power procured from BAE, General Atomics, and Raytheon. • Complete concept of operations for powder gun defense with Army and Navy transition partners. • Complete system requirements document and system design document to support live fire testing beginning in FY 2017. • Conduct closed-loop live-fire testing with 20 MJ Railgun and powder guns against synthetic targets. • Build government-designed projectiles for FY 2016 and FY 2017 testing. • Conduct Railgun Mount CDR with BAE. • Test maneuvering projectile capabilities in hardware-in-the-loop at JHU/APL and railgun and powder gun live-fire demonstrations at WSMR. • Support projectile testing for sea-based Railgun tests with equipment and facilities at WSMR. • Continue prototype fire control sensor development with GTRI to support closed loop fire control tests beginning in FY 2018. • Continue to anchor NSWC/DD, MSIC, and JHU/APL models and simulations with test data. • 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 fabrication of 32 MJ prototype Railgun mount for live fire testing beginning in FY 2018. 				
Title: Assured Tactical C2 (ATC2)		-	31.390	14.359
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				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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.			
<p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Conduct design reviews and operational technology exchanges to incorporate Army, Air Force, Navy, and U.S. Marine Corps tactical cloud requirements into an integrated, secure, assured capability. • Acquire hardware, software, and test design solutions and evaluate components in a trusted environment. • Begin 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. • Begin development of enhanced security and vulnerability assessments. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • 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. 			
<p>Title: Advanced Navigation</p> <p>Description: Leverage existing technologies to analyze and demonstrate a prototype advanced navigation technique for contested environments. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.</p> <p>FY 2015 Plans:</p> <p>Project will apply existing technologies to demonstrate advanced navigation techniques on weapons and platforms to include manned and unmanned vehicles. FY 2015 efforts will include design, prototyping, data collections, and tests. Test results will be used to anchor modeling and simulation performance results and develop operationally-relevant proof-of-principle demonstrations.</p> <ul style="list-style-type: none"> • Analyze mount options. • Purchase prototype hardware, perform integration analysis of existing platform and conduct tests. • Begin modeling and analysis of sensor size, accuracy, and detection range to include satellite brightness. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Develop and conduct operationally-relevant proof-of-principle demonstrations to anchor modeling and simulation performance results. 	-	15.250	16.359
<p>Title: Intelligence, Surveillance, and Reconnaissance (ISR) Denial</p>	-	14.950	19.356

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Initiate collaboration across DoD laboratories on potential ISR denial solutions. • Identify trade space between different technical approaches. • Complete ISR Critical Design Review (CDR). • Purchase and integrate hardware which supports 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). • Perform initial testing of the system to validate system performance. • Begin work on modeling and simulation efforts to better inform CONOPS development. • Begin preliminary efforts to ensure integration with related efforts. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Continue modeling and simulation in support of CONOPS development. • Plan and execute operationally-relevant proof-of-principle demonstrations with the Fleet in preparation for program of record transition. 			
<p>Title: Enhanced Munitions</p> <p>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.</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Complete a Preliminary Design Review (PDR) and down select from multiple prototype designs. • Conduct system modeling, simulation, and prototype performance trades. • Perform analysis and subsystem testing to develop operationally-relevant proof-of-principle demonstrations. • Pursue target component modeling, simulation, and vulnerability testing. • Verify target component vulnerability and anchor component models. • Develop target engagement requirements. 	-	11.162	23.359

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015	
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015
<ul style="list-style-type: none"> Initiate design and build of surrogate target. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Complete a CDR. Build a prototype (size, weight, and power constrained) for enhanced munition. Integrate components into a target surrogate and perform vulnerability testing to anchor models and simulations. Test prototype capability against target surrogate to verify effectiveness. 			
<p>Title: Sea Dragon</p> <p>Description: Cost-effective 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.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Complete analysis of off-board targeting options to close operationally relevant kill chains. Prepare and develop modeling and simulation in support of static ground testing. Prepare test facilities and weapon firing ranges for subsequent testing. Update and refine performance characteristics in modeling and simulation based on static testing. Identify and analyze alternative targeting methods to enable down select and follow on demonstrations. Conduct hardware-in-the-loop sub-system testing. Procure long lead range test articles. Initiate planning to demonstrate use of various targeting methods. Begin detailed studies on platform, fire control and weapon integration and interoperability in support of future end to end demonstration (FY 2020). 		-	-
<p>Title: Unmanned Aerial Vehicle Payloads</p> <p>Description: SCO will leverage existing low-cost payloads by integrating them with Unmanned Aerial Vehicles (UAVs) (e.g. micro-UAVs) capable of autonomous swarming behavior. This project seeks to demonstrate the operational effectiveness and tactical advantage provided by large numbers of collaborative, expendable platforms. Effectiveness analysis and prototyping of payloads integrated with UAVs will be conducted, with initial demonstrations planned in FY 2016. This project is currently funded within the Advanced Innovative Analysis and Concepts Program Element 0603289D8Z under the Low-Cost Payloads project and will transition to the Advanced Innovative Technologies Program Element 0604250D8Z in FY 2016. Due to the nature of these projects, specific applications and detailed plans are available at a higher classification level.</p> <p>FY 2016 Plans:</p>		-	-
		81.000	24.950

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Complete CDR for UAV platforms. • Complete payload trade studies to support CONOPS refinement. • Perform subsystem and integration testing. • Conduct initial prototype demonstration. • Anchor modeling and simulations and update operational effectiveness assessment. 				
<p>Title: Sea Mob</p> <p>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. Building on the successful ONR funded USV swarm demonstration in August 2014, this project seeks to demonstrate the ability to generate common situational awareness among USVs and the communications required for sustaining cooperative behaviors. More complex demonstrations are planned over the next several years to 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.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Complete refinement of rule based algorithms for cooperative behaviors of small boats, to conduct swarm engagements. • Demonstrate simple cooperative behavior among USVs and common situational awareness: sensing, fusion, object recognition, and contact/hazard avoidance. • Begin planning for more complex cooperative behavior demonstrations that include additional sensors, more robust navigation, and reliable communications. 		-	-	19.985
Accomplishments/Planned Programs Subtotals		125.811	174.752	469.798
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
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.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware	IA	Sandia : NM	-	3.822	Jul 2014	1.572	Mar 2015	1.323	Oct 2015	-		1.323	-	-	-
Primary Hardware	MIPR	SOSSEC : NJ	-	27.377	Apr 2014	6.078	Jan 2015	16.330	Oct 2015	-		16.330	-	-	-
Primary Hardware	MIPR	DOTC : NJ	-	19.326	Apr 2014	28.836	Feb 2015	42.812	Oct 2015	-		42.812	-	-	-
Systems Engineering	MIPR	NSWCDD : VA	-	13.882	Apr 2014	16.849	Mar 2015	26.163	Oct 2015	-		26.163	-	-	-
Primary Hardware	MIPR	BAE : VA	-	18.388	Jul 2014	6.288	Jan 2015	-		-		-	-	-	-
Primary Hardware	MIPR	Raytheon : VA	-	16.528	Jul 2014	-		-		-		-	-	-	-
Primary Hardware	MIPR	L3 : Various	-	4.373	Jul 2014	1.048	Jan 2015	17.250	Oct 2015	-		17.250	-	-	-
Primary Hardware	MIPR	US ARMY FCE : Various	-	0.770	Jul 2014	4.780	Jan 2015	5.750	Oct 2015	-		5.750	-	-	-
Primary Hardware	MIPR	MARCORSYSCOM : VA	-	0.502	Jul 2014	-		53.475	Oct 2015	-		53.475	-	-	-
Primary Hardware	MIPR	ARDEC : NJ	-	-		1.048	Feb 2015	1.150	Feb 2015	-		1.150	-	-	-
Primary Hardware	MIPR	MDA : VA	-	1.766	Apr 2014	6.288	Nov 2014	52.509	Oct 2015	-		52.509	-	-	-
Primary Hardware	MIPR	ARDEC : MD	-	0.403	Jul 2014	-		-		-		-	-	-	-
Primary Hardware	MIPR	MSIC : AL	-	3.616	Apr 2014	1.572	Nov 2014	1.725	Oct 2015	-		1.725	-	-	-
Primary Hardware	MIPR	NSWCIRD : MD	-	1.550	Apr 2014	0.524	Nov 2014	0.575	Oct 2015	-		0.575	-	-	-
Primary Hardware	MIPR	NSWCDD : VA	-	0.439	Apr 2014	0.210	Oct 2014	0.230	Oct 2015	-		0.230	-	-	-
Primary Hardware	MIPR	JHU/APL : MD	-	4.811	Apr 2014	8.699	Nov 2014	9.364	Oct 2015	-		9.364	-	-	-
Subtotal			-	117.553		83.792		228.656		-		228.656	-	-	-

Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management	MIPR	NAVSEA : DC	-	0.828	Apr 2014	1.478	Nov 2014	1.150	Oct 2015	-		1.150	-	-	-
Program Management	MIPR	NSWCDD : VA	-	1.463	Apr 2014	1.593	Mar 2015	2.214	Oct 2015	-		2.214	-	-	-
Subtotal			-	2.291		3.071		3.364		-		3.364	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development, Test & Evaluation	MIPR	NSWCDD : Dahlgren, VA	-	3.676	Oct 2014	2.017	Mar 2015	4.658	Oct 2015	-		4.658	-	-	-
Development, Test & Evaluation	MIPR	WSMR : NM	-	-		6.754	Nov 2014	13.053	Oct 2015	-		13.053	-	-	-
Development, Test & Evaluation	MIPR	SOSSEC : NJ	-	2.291	Jul 2014	6.366	Jan 2015	20.699	Oct 2015	-		20.699	-	-	-
Assured Tactical C2	MIPR	ONR, NRL, AFRL, ARL : DMV	-	-		31.390	Oct 2014	14.359	Oct 2015	-		14.359	-	-	-
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	-	-		12.250	Feb 2015	16.359	Oct 2015	-		16.359	-	-	-
Intelligence, Surveillance, and Reconnaissance (ISR) Denial	MIPR	JHU/APL : MD	-	-		14.950	Oct 2014	19.356	Oct 2015	-		19.356	-	-	-
Enhanced Munitions	MIPR	MSIC, MDA : AL, VA	-	-		11.162	Nov 2014	23.359	Oct 2015	-		23.359	-	-	-
Dea Dragon	MIPR	IWS, NAVSEA, NUWC, SPAWAR, NAVAIR & JHU/ APL : Various	-	-		-		81.000	Oct 2015	-		81.000	-	-	-
Unmanned Aerial Vehicle Payloads	MIPR	MIT/LL, SSC Pacific, NAWCWD : Various	-	-		-		24.950	Oct 2015	-		24.950	-	-	-
Sea Mob	MIPR	NSWC/CCD, NSWC/ PCD, JHU/APL, PSU/ARL, JPL : Various	-	-		-		19.985	Oct 2015	-		19.985	-	-	-
Subtotal			-	5.967		87.889		237.778		-		237.778	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		-	125.811	174.752	469.798	-	-	469.798	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
<i>Railgun Command Projectile Maneuvers</i>																												
Railgun Command Projectile Maneuvers																												
<i>Railgun Airframe Flight</i>																												
Railgun Airframe Flight																												
<i>Railgun Prototype Mount CDR</i>																												
Railgun Prototype Mount CDR																												
<i>Railgun SRD</i>																												
Railgun SRD																												
<i>Railgun Install Tracker Hardware and Track Projectile</i>																												
Install Railgun Tracker Hardware and Track Projectile																												
<i>Railgun Decision to proceed with Prototype Testing</i>																												
Decision to proceed w/ Railgun Prototype Testing																												
<i>Railgun Install Multisensor Hardware/Track Projectile</i>																												
Install Railgun Multisensor Hardware/Track Projectile																												
<i>Railgun Guidance and Control Demonstration</i>																												
Railgun Guidance and Control Demonstration																												
<i>Railgun SDD</i>																												
Railgun SDD																												
<i>Railgun Payload Dispense</i>																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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								■																				
<i>Railgun Prototype Mount PDR</i>																												
Railgun Prototype Mount PDR								■																				
<i>Railgun Proof-of-Principle Fire Control Sensors</i>																												
Railgun Proof-of-Principle Fire Control Sensors								■																				
<i>Railgun Track Maneuvering Projectile</i>												■																
Railgun Track Maneuvering Projectile												■																
<i>Railgun Test System at WSMR</i>																												
Install Railgun Test System at WSMR												■																
<i>ATC2: Integrate Service Clouds</i>																												
Integrate Service Clouds								■																				
<i>ATC2: Advanced Security Enabled</i>																												
Advanced Security Enabled								■																				
<i>ATC2: Red Teaming</i>																												
Red Teaming												■																
<i>Advanced Navigation USAF Contract Award</i>																												
USAF Contract Award								■																				
<i>Advanced Navigation Weapons Drop Tests</i>																												
Weapons Drop Tests												■																
<i>ISR Denial Complete CDR</i>																												
Complete CDR								■																				
<i>ISR Denial Initial Systems Test</i>																												
Initial Systems Test								■																				
<i>ISR Denial Fleet Demonstration</i>																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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																												
<i>Enhanced Munitions Complete PDR</i>																												
Complete PDR																												
<i>Enhanced Munitions Complete CDR</i>																												
Complete CDR																												
<i>Sea Dragon Initial Launch Demonstration</i>																												
Initial Launch Demonstration																												
<i>Sea Dragon Follow-on Launch Demonstration</i>																												
Follow-on Launch Demonstration																												
<i>Unmanned Aerial Vehicle Payloads CDR</i>																												
CDR																												
<i>Unmanned Aerial Vehicle Payloads Swarming Demo</i>																												
Swarming Demo																												
<i>Sea Mob Single Vehicle Autonomy at Extended Range</i>																												
Single Vehicle Autonomy at Extended Range																												
<i>Sea Mob Simple Cooperative Behavior</i>																												
Simple Cooperative Behavior																												
<i>Sea Mob Complex Cooperative Behavior</i>																												
Complex Cooperative Behavior																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604250D8Z / <i>Advanced Innovative Technologies</i>	Project (Number/Name) P250 / <i>Advanced Innovative Technologies</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Railgun Command Projectile Maneuvers</i>				
Railgun Command Projectile Maneuvers	2	2016	2	2016
<i>Railgun Airframe Flight</i>				
Railgun Airframe Flight	1	2014	1	2014
<i>Railgun Prototype Mount CDR</i>				
Railgun Prototype Mount CDR	3	2016	3	2016
<i>Railgun SRD</i>				
Railgun SRD	3	2016	3	2016
<i>Railgun Install Tracker Hardware and Track Projectile</i>				
Install Railgun Tracker Hardware and Track Projectile	1	2014	1	2014
<i>Railgun Decision to proceed with Prototype Testing</i>				
Decision to proceed w/ Railgun Prototype Testing	4	2016	4	2016
<i>Railgun Install Multisensor Hardware/Track Projectile</i>				
Install Railgun Multisensor Hardware/Track Projectile	4	2014	4	2014
<i>Railgun Guidance and Control Demonstration</i>				
Railgun Guidance and Control Demonstration	3	2015	3	2015
<i>Railgun SDD</i>				
Railgun SDD	4	2016	4	2016
<i>Railgun Payload Dispense</i>				
Railgun Payload Dispense	4	2015	4	2015
<i>Railgun Prototype Mount PDR</i>				
Railgun Prototype Mount PDR	3	2015	3	2015

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604250D8Z / <i>Advanced Innovative Technologies</i>	Project (Number/Name) P250 / <i>Advanced Innovative Technologies</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Railgun Proof-of-Principle Fire Control Sensors</i>				
Railgun Proof-of-Principle Fire Control Sensors	4	2015	4	2015
<i>Railgun Track Maneuvering Projectile</i>				
Railgun Track Maneuvering Projectile	1	2016	1	2016
<i>Railgun Test System at WSMR</i>				
Install Railgun Test System at WSMR	2	2016	2	2016
<i>ATC2: Integrate Service Clouds</i>				
Integrate Service Clouds	4	2015	1	2016
<i>ATC2: Advanced Security Enabled</i>				
Advanced Security Enabled	1	2016	2	2016
<i>ATC2: Red Teaming</i>				
Red Teaming	2	2016	4	2016
<i>Advanced Navigation USAF Contract Award</i>				
USAF Contract Award	3	2015	3	2015
<i>Advanced Navigation Weapons Drop Tests</i>				
Weapons Drop Tests	4	2016	1	2017
<i>ISR Denial Complete CDR</i>				
Complete CDR	2	2015	2	2015
<i>ISR Denial Initial Systems Test</i>				
Initial Systems Test	4	2015	4	2015
<i>ISR Denial Fleet Demonstration</i>				
Fleet Demonstration	3	2016	3	2016
<i>Enhanced Munitions Complete PDR</i>				
Complete PDR	4	2015	4	2015
<i>Enhanced Munitions Complete CDR</i>				

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604250D8Z / <i>Advanced Innovative Technologies</i>	Project (Number/Name) P250 / <i>Advanced Innovative Technologies</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Complete CDR	4	2016	4	2016
<i>Sea Dragon Initial Launch Demonstration</i>				
Initial Launch Demonstration	1	2016	4	2016
<i>Sea Dragon Follow-on Launch Demonstration</i>				
Follow-on Launch Demonstration	2	2016	3	2017
<i>Unmanned Aerial Vehicle Payloads CDR</i>				
CDR	2	2016	2	2016
<i>Unmanned Aerial Vehicle Payloads Swarming Demo</i>				
Swarming Demo	4	2016	4	2016
<i>Sea Mob Single Vehicle Autonomy at Extended Range</i>				
Single Vehicle Autonomy at Extended Range	4	2015	4	2015
<i>Sea Mob Simple Cooperative Behavior</i>				
Simple Cooperative Behavior	4	2016	4	2016
<i>Sea Mob Complex Cooperative Behavior</i>				
Complex Cooperative Behavior	1	2018	1	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604400D8Z I <i>Unmanned Systems Common Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	35.394	7.977	7.791	3.129	-	3.129	3.486	3.992	3.847	3.899	Continuing	Continuing
P440: <i>UAS Airspace Integration</i>	20.938	3.675	6.599	2.103	-	2.103	2.357	2.652	2.590	2.596	Continuing	Continuing
P442: <i>Interoperability</i>	13.737	4.130	1.022	0.859	-	0.859	0.900	1.100	1.000	1.033	Continuing	Continuing
P443: <i>Unmanned Systems Roadmap</i>	0.719	0.172	0.170	0.167	-	0.167	0.229	0.240	0.257	0.270	Continuing	Continuing

Note

PE 0305220F: RQ-4 UAV (Global Hawk) contains funding for the Common-ABSAA development.
 PE 0305219A: MQ-1 Gray Eagle UAV contains additional funding for GBSAA development.
 PE 0305220N: RQ-4 UAV (MQ-4 Triton) contains funding for an initial common RQ/MQ-4 ABSAA capability via a Pilot In The Loop (PITL) Due Regard system.
 The FY2014 President's Budget transferred \$83.169M (FYDP) to the above UAS programs' PEs.

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) Unmanned Systems 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 will initially focus 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 will be the primary focus, interoperability among all unmanned and manned systems is the long-term goal.

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	8.263	3.702	3.150	-	3.150
Current President's Budget	7.977	7.791	3.129	-	3.129
Total Adjustments	-0.286	4.089	-0.021	-	-0.021
• Congressional General Reductions	-	-0.011			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.100			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.037	-			
• SBIR/STTR Transfer	-0.249	-			
• FY 2016 Baseline Adjustment	-	-	-0.021	-	-0.021

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P440: <i>UAS Airspace Integration</i>	20.938	3.675	6.599	2.103	-	2.103	2.357	2.652	2.590	2.596	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 using existing technology to provide a near-term solution for improved airspace access, both for terminal operations and for operations/training within the GBSAA system's coverage area (e.g., Gray Eagle at El Mirage, Shadow operations at Cherry Point).

This joint funding also supports development of common operating concepts, 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 2014	FY 2015	FY 2016
Title: Unmanned Aircraft System Airspace Integration Initiatives	3.675	6.599	2.103
<p>Description: Starting in FY 2010 the Department's sense-and-avoid (SAA) developmental efforts are enhanced by this defense-wide program element. This program provides 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 develops UAS airspace integration requirements and standards, as well as supports the modeling, simulation, and operational analysis needed to validate the systems and standards. In FY 2013 ABSAA and GBSAA efforts transitioned to the Services.</p> <p>FY 2014 Accomplishments: Standards Development - Continued the update of MIL-HDBK-516 for airworthiness criteria, standards, and methods of compliance for both fixed and rotary wing UAS, and SAA systems. Leveraged Probabilistic Risk Assessment (PRA) and Markov Decision Process (MDP) methodologies to better understand SAA system conflict mitigation strategies to support the development of a safety case for integrating UAS in the NAS. Completed and published an update to the UAS Airspace Integration CONOPS. Researched and facilitated a DoD-wide exemption to 14 CFR 91.113 to enable specified DoD UAS operations in the NAS. Conducted operational analysis to assist DoD in overcoming UAS AI challenges.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Modeling & Simulation (M&S) - Supported analysis of modeling and simulation requirements to address high priority research gaps, as identified by the SAA Science and Research Panel (SARP).</p> <p>FY 2015 Plans: Standards Development - Complete and publish the update of MIL-HDBK-516 for airworthiness criteria, standards, and methods of compliance for both fixed and rotary wing UAS and SAA integrated in these aircraft systems. Continue work to define airworthiness requirements for small UAS (Groups 1-3). Continue ongoing analysis of UAS Airspace Integration safety case development issues in order to facilitate expanded UAS access to the NAS. Conduct analysis to address high priority safety gaps as identified by the SARP. Expand scope of the SARP to include additional UAS integration issues relevant to DoD. Coordinate system requirements and safety guidelines within appropriate standards development organizations. Conduct operational analysis to assist DoD in overcoming UAS AI challenges. Work with the FAA to update DoD/FAA Memorandum of Agreement (MOA) as related to current FAA guidelines regarding UAS operations in DoD managed airspace.</p> <p>Modeling & Simulation (M&S) - Support analysis of modeling and simulation requirements to address high priority research gaps, as identified by the SARP. Continue to support Joint Test programs related to UAS operations in US airspace.</p> <p>Funding includes a FY 2015 Congressional Add of \$4.089 million.</p> <p>FY 2016 Plans: Standards Development – Complete updates to and implement DoD/FAA MOA. Work with OUSD(Policy) and Joint Staff to implement findings from Joint Test of UAS operation in US airspace. Complete small UAS Groups 1-3 airworthiness requirements work and provide document to DOD and OSD for possible annex to MIL-HDBK-516C (TBD). Complete survey and analysis of UAS CONUS operating locations and airspace requirements. Continue to identify and address research gaps as identified by the SARP.</p>			
Accomplishments/Planned Programs Subtotals	3.675	6.599	2.103

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Airworthiness	Various	AED/AFMLCC/ NAVAIR : AL/OH/MD	-	0.366		0.200		-		-		-	-	-	-
Subtotal			-	0.366		0.200		-		-		-	-	-	-

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)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SARP	Various	MITRE/NMSU : VA/ NM	-	0.300		0.650		0.600		-		0.600	-	-	-
Integration Studies & Analysis	MIPR	Various : Various	-	0.722		1.250		0.910		-		0.910	-	-	-
UAS Task Force	MIPR	Various : Various	20.938	2.287		0.410		0.593		-		0.593	-	-	-
Congressional Add	TBD	TBD : TBD	0.000	-		4.089		-		-		-	-	4.089	-
Subtotal			20.938	3.309		6.399		2.103		-		2.103	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		20.938	3.675	6.599	2.103	-	-	-	-

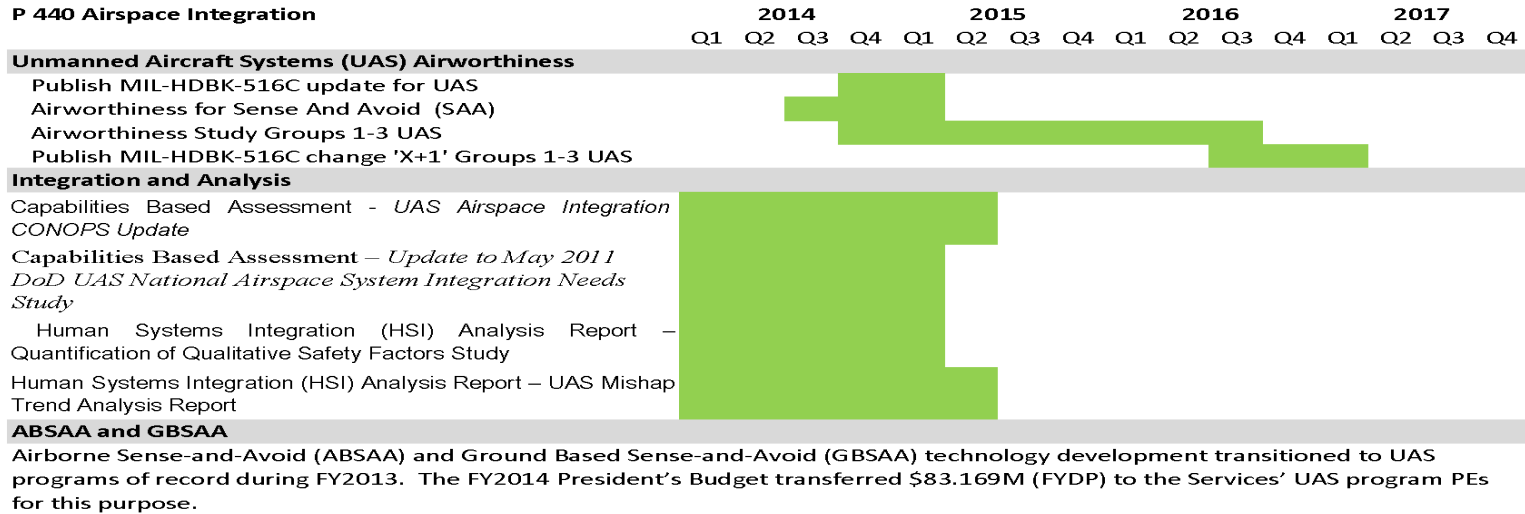
Remarks
Airborne Sense-and-Avoid (ABSAA) and Ground Based Sense-and-Avoid (GBSAA) technology development transitioned to UAS programs of record during FY2013. This joint funding also supports development of common operating concepts, standards, modeling and simulation, and technology to enable DoD UAS to routinely access the national and international airspace systems.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>
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P 440 Airspace Integration



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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P440 / <i>UAS Airspace Integration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>UAS Airworthiness</i>				
Publish MIL-HDBK-516C update for UAS	4	2014	1	2015
Airworthiness for Sense And Avoid (SAA)	3	2014	1	2015
Airworthiness Study - Groups 1-3 UAS	4	2014	3	2016
Publish MIL-HDBK-516C change 'X+1' Groups 1-3 UAS (TBD)	3	2016	1	2017
<i>Integration and Analysis</i>				
Capabilities Based Assessment - UAS Airspace Integration CONOPS Update	1	2014	2	2015
Capabilities Based Assessment – Update to May 2011 DoD UAS National Airspace System Integration Needs Study	1	2014	1	2015
Human Systems Integration (HSI) Analysis Report – Quantification of Qualitative Safety Factors Study	1	2014	1	2015
Human Systems Integration (HSI) Analysis Report – UAS Mishap Trend Analysis Report	1	2014	2	2015

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P442 / <i>Interoperability</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P442: <i>Interoperability</i>	13.737	4.130	1.022	0.859	-	0.859	0.900	1.100	1.000	1.033	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 RQ/MQ-4 (Global Hawk/Triton), MQ-1 (Predator/Gray Eagle), MQ-5 (Hunter), MQ-8 (Fire Scout), MQ-9 (Reaper), and other 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 2014	FY 2015	FY 2016
Title: Interoperability	4.130	1.022	0.859
<p>Description: Develop and demonstrate an interoperable, standards-based, open ground station architecture for RQ/MQ-4 (Global Hawk/TRITON), MQ-1 (Predator/Gray Eagle), MQ-5 (Hunter), MQ-8 (Fire Scout), MQ-9 (Reaper), and other cross-domain (air, ground, maritime) unmanned systems; improve joint and coalition interoperability; and promote competition through the implementation of open standards and open architectures.</p> <p>FY 2014 Accomplishments: Released UAS Control Segment (UCS) V3.2 and V3.3, integrated Army/Navy flight safety critical and information assurance requirements; completed Phase I alignment with the Joint Common Unmanned System Architecture (JCUA), Universal Systems Interoperability Profile (USIP), and Future Airborne Capability Environment (FACE) standard; and demonstrated UCS in hardware-in-the-loop Unmanned Maritime System (UMS) maritime simulations. Phase I alignment identified "integration touch points" and an agreed upon integration - alignment plan. Phase II is to complete the integration - alignment, this work has commenced. USIP 1.1 update 2013 posted to the DoD IT Standards Registry (DISR) as a mandated standard.</p> <p>FY 2015 Plans: Release UCS V3.4 and V3.5. Complete Phase II alignment with JCUA, USIPs, and FACE. Assess National Information Exchange Model (NIEM) for adoption. Complete UCS Repository Technical Governance documentation which will provide UAS Programs of Record, 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. Continue to support UCS PoR migration, to include a UMS maritime demonstration test in a lab environment, and if successful, the potential for a live UMS maritime operational test. 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). Complete JGRE studies on Communication Waveform Analysis; Military Standard/Interoperability Profile Transition to Industry Standards; and Common</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P442 / <i>Interoperability</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Control Architecture. Initiate UCS Open Business Model (OBM) revision to include all unmanned system domains (air, ground, maritime).			
<i>FY 2016 Plans:</i> Release UCS V3.6 and V3.7. Support, prepare, and conduct a live UMS maritime operational test. Support, prepare, and conduct a live UGR operational test. Continue cross-domain (air, ground, maritime) harmonization efforts in coordination with the JRAST. Complete UCS OBM revision.			
Accomplishments/Planned Programs Subtotals	4.130	1.022	0.859

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-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P442 / <i>Interoperability</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UCS Architecture	MIPR	COLSA : AL	13.737	1.515		-		-		-		-	-	-	-
JGRE	Various	Various : Various	0.000	0.900		0.200		-		-		-	-	-	-
Subtotal			13.737	2.415		0.200		-		-		-	-	-	-

Remarks
Prior Year cost are shown under UCS Architecture the primary product for P442.

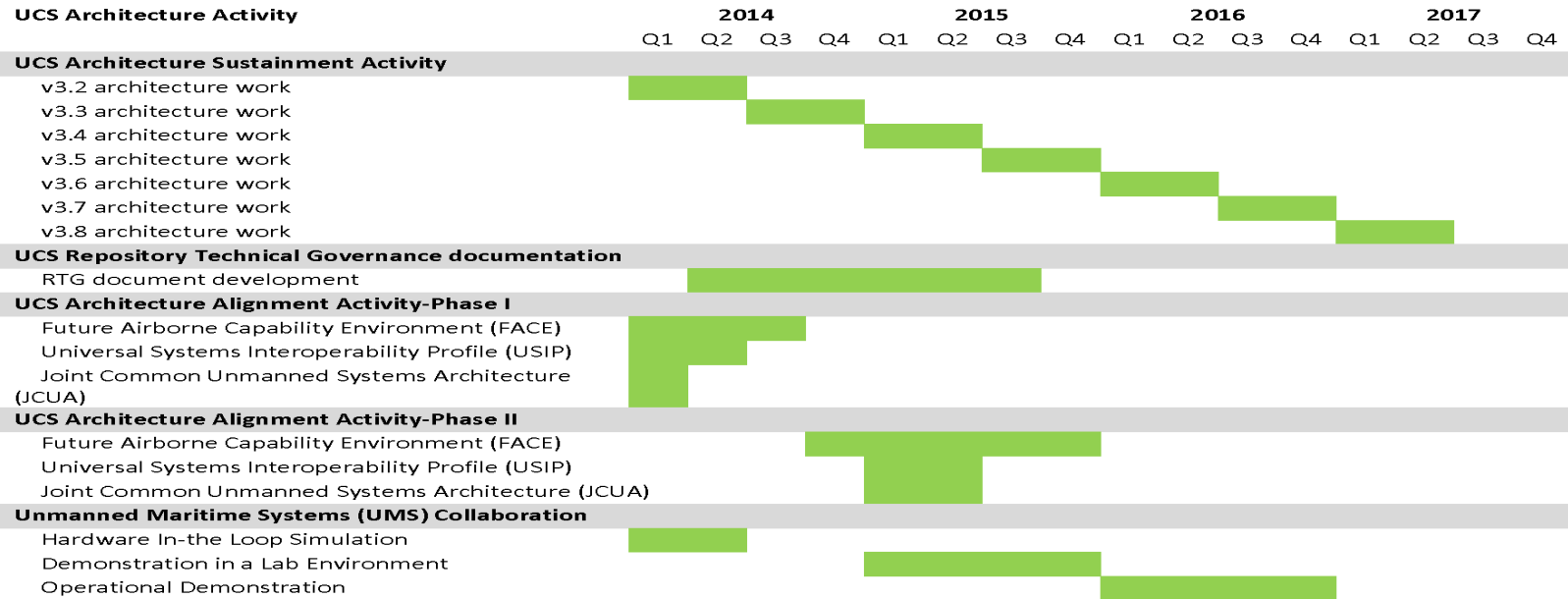
Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Interoperability Working Groups & Studies	Various	Various : Various	-	1.124		0.522		0.266		-		0.266	-	-	-
UAS Task Force	MIPR	MTSI : VA	-	0.291		-		0.293		-		0.293	-	-	-
Weapons Integration	MIPR	NAWC-WD : China Lake, CA	-	0.300		0.300		0.300		-		0.300	-	-	-
Subtotal			-	1.715		0.822		0.859		-		0.859	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		13.737	4.130	1.022	0.859	0.859	-	-	-

Remarks
Interoperability efforts are focused on developing and demonstrating an 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. UAS Control Segment (UCS) V3.2 was released in FY 2014.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P442 / <i>Interoperability</i>



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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P442 / <i>Interoperability</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>UCS Architecture Sustainment Activity</i>				
v3.2 architecture work	1	2014	2	2014
v3.3 architecture work	3	2014	4	2014
v3.4 architecture work	1	2015	2	2015
v3.5 architecture work	3	2015	4	2015
v3.6 architecture work	1	2016	2	2016
v3.7 architecture work	3	2016	4	2016
v3.8 architecture work	1	2017	2	2017
<i>UCS Repository Technical Governance</i>				
RTG document development	2	2014	3	2015
<i>UCS Architecture Alignment Activity-Phase II</i>				
Future Airborne Capability Environment (FACE)	4	2014	4	2015
Universal Systems Interoperability Profile (USIP)	1	2015	2	2015
Joint Common Unmanned Systems Architecture (JCUA)	1	2015	2	2015
<i>Unmanned Maritime Systems (UMS) Collaboration</i>				
Demonstration in a Lab Environment	1	2015	4	2015
Operational Demonstration	1	2016	4	2016

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P443 / <i>Unmanned Systems Roadmap</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P443: <i>Unmanned Systems Roadmap</i>	0.719	0.172	0.170	0.167	-	0.167	0.229	0.240	0.257	0.270	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 2014	FY 2015	FY 2016
Title: Unmanned Systems Roadmap	0.172	0.170	0.167
Description: Develops and updates the Department's Unmanned Systems Integrated Roadmap.			
FY 2014 Accomplishments: Published the Department's "Unmanned Systems Integrated Roadmap, FY 2013-2038" and performed related studies supporting the Department's vision for unmanned systems. Established and maintained an on-line unmanned system catalogue for DoD use.			
FY 2015 Plans: Update the Department's Unmanned Systems Integrated Roadmap and perform related studies supporting the Department's vision for unmanned systems. Maintain the on-line unmanned system catalogue for DoD use.			
FY 2016 Plans: Update and publish the Department's "Unmanned Systems Integrated Roadmap, 2015-2040" and perform related studies supporting the Department's vision for unmanned systems. Maintain the on-line unmanned system catalogue for DoD use.			
Accomplishments/Planned Programs Subtotals	0.172	0.170	0.167

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P443 / <i>Unmanned Systems Roadmap</i>

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P443 / <i>Unmanned Systems Roadmap</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Unmanned Systems Roadmap	Various	Various : Various	0.719	0.172		0.170		0.167		-		0.167	-	-	-
Subtotal			0.719	0.172		0.170		0.167		-		0.167	-	-	-
Project Cost Totals			0.719	0.172		0.170		0.167		-		0.167	-	-	-

Remarks
 This effort supports the Department's Unmanned Systems Integrated Roadmap and updates. The roadmap is published every two years, with the most recent edition released in FY 2014.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P443 / <i>Unmanned Systems Roadmap</i>

	2014				2015				2016				2017				2018				2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Unmanned Systems Integrated Roadmap																												
2015-2040 Edition																												
2017-2042 Edition																												
2019-2044 Edition																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604400D8Z / <i>Unmanned Systems Common Development</i>	Project (Number/Name) P443 / <i>Unmanned Systems Roadmap</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Unmanned Systems Integrated Roadmap</i>				
2015-2040 Edition	3	2014	2	2016
2017-2042 Edition	3	2016	2	2018
2019-2044 Edition	3	2018	2	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 0604670D8Z I Human Social Culture Behavior (HSCB) Modeling Research and Engineering
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing
P670: Human Social Culture Behavior (HSCB) Modeling Research and Engineering	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Office of the Secretary of Defense (OSD) Human Social Culture Behavior (HSCB) Modeling Program is a vertically integrated effort to research, develop, and transition technologies, tools, and systems to programs of record and users in need. The Program exists to optimize U.S. forces' ability to perform population-centric sensing, understand behaviors driven by social and cultural variables, and select effective courses of action in the full range of military operations. Program research will enhance population-centric intelligence, surveillance, and reconnaissance (ISR) capabilities for understanding the increasingly complex global environment to address national strategic challenges such as instability, aggression, proliferation of weapons of mass destruction, and violent extremism. In three integrated program elements (PEs), the Program will conduct applied research, mature and demonstrate advanced technology, and develop transitionable methods, technology, tools, and prototypes. Work under PE 0604670D8Z will create transition ready software tools that will help intelligence analysts, operations analysts, operations planners, wargamers, and others represent, understand, and forecast sociocultural behavior at the strategic, operational, and tactical levels. This program focuses on maturing, hardening, and validating human, social, culture, and behavior modeling software for transition to meet the needs of the warfighter, integration into the architectures of existing programs of record, and/or maturing software via open architectures to allow broad systems integration. The Program provides a development to product transition pathway for sociocultural models, tools, and capabilities to rapidly meet immediate and emerging warfighter needs. The work supports the testing, validation, and transition of model-based technology into existing and developing systems in coordination with Program Executive Offices or Program Managers, Combatant Commanders, Joint and Service organizations, warfighters in need, and other transition customers. The Program will mature sociocultural relevant data and tools to provide essential sociocultural understanding and forecasting capabilities at the strategic, operational and tactical levels.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	2.000	-	-	-	-
Current President's Budget	2.000	-	-	-	-
Total Adjustments	-	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>	Project (Number/Name) P670 / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P670: Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>	-	2.000	-	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program will create transition-ready software tools that will help intelligence analysts, operations analysts, operations planners, wargamers, and others represent, understand, and forecast sociocultural behavior at the strategic, operational, and tactical levels. The Program focuses on maturing, hardening, and validating human, social, culture, and behavior modeling software for transition to meet the needs of the warfighter, integration into the architectures of existing programs of record, and/or maturing software via open architectures to allow broad systems integration. The Program provides a development to product transition pathway for sociocultural models, tools, and capabilities to rapidly meet immediate and emerging warfighter needs. The work supports the testing, validation, and transition of model-based technology into existing and developing systems in coordination with Program Executive Offices or Program Managers, Combatant Commanders, Joint and Service organizations, warfighters in need, and other transition customers. The Program will mature sociocultural relevant data and tools to provide essential forecasting capabilities at the strategic, operational, and tactical levels.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Modeling Capabilities</p> <p>Description: Mature and deliver sociocultural modeling capabilities for integration into existing DoD systems. Conduct validation testing of HSCB model based applications. Complete development of sentiment analysis (iSENT) component into the Worldwide Integrated Crisis Early Warning System (W-ICEWS), increase the volume and range of data sources, and increase sensitivity of the core instability detection capability. Extend and complete sentiment analysis component to social media. Extend and complete SPECTRUM capabilities for countering violent extremism, with enhanced organization tracking, mining of social media, and coverage of additional regions. Demonstrate and complete prototype social radar in the Distributed Common Ground System-Army (DCGS-A) or comparable environment for one or more of the following use cases: counterinsurgency, counterterrorism, countering violent extremism, countering-weapons of mass destruction, countering transnational criminal organizations, or mitigating the effect of adversarial nation state influence.</p> <p>FY 2014 Accomplishments: Further developed W-ICEWS capabilities by improving sentiment accuracies of English and Spanish language models to meet 80 percent target accuracy goal. Added Arabic model to include complex Arabic dialect feature analysis.</p>	1.000	-	-
<p>Title: Data Collection</p>	0.700	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604670D8Z / Human Social Culture Behavior (HSCB) Modeling Research and Engineering	Project (Number/Name) P670 / Human Social Culture Behavior (HSCB) Modeling Research and Engineering

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Description: Develop and test methods and tools for collection of sociocultural behavior data, including and especially in denied areas. Demonstrate resources and tools for extraction, integrated analysis, and fusion of data from open sources at scale with particular focus on social media. Support development and testing of architectures and systems to enable access to structured, validated sociocultural behavior data across tactical to strategic levels. Complete development of and demonstrate ability to ingest, structure, and visualize multiple data modalities at scale, in real-time, or near real-time to support both short-term and long-term instability monitoring. Complete development and demonstration of transition-ready automated data collection, management, translation, and extraction tools to service HSCB models.</p> <p>FY 2014 Accomplishments: Extended iSENT capability to automatically identify potential disinformation and quantify the spread and/or influence of that disinformation based on content and degree of social networking reach. Developed dashboard capability that allows the user to configure a custom dashboard that includes automated alerts, social momentum gauges and graphs, real-time streaming of social and regular media, and television feeds.</p>			
<p>Title: Risk Reduction</p> <p>Description: Conduct the risk reduction activities necessary to ensure that HSCB technologies are validated, accurate, and address user/program of record requirements. Continue to apply existing processes for evaluating discrete research projects. Gather data necessary to populate existing Program level measures of effectiveness. Develop, complete, and transition rapid prototypes to demonstrate technology effectiveness toward new U.S. Government challenges. Quantify effect of HSCB technologies on user effectiveness and efficiency.</p> <p>FY 2014 Accomplishments: Conducted risk reduction activities necessary to ensure that HSCB technologies are validated, accurate, and address user/program of record requirements. Continued to apply existing processes for evaluating research projects.</p>	0.300	-	-
Accomplishments/Planned Programs Subtotals	2.000	-	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PE 0602670D8Z BA 2: HSCB Applied Research	2.000	-	-	-	-	-	-	-	-	-	Continuing Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>	Project (Number/Name) P670 / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PE 0603670D8Z BA 3: <i>HSCB Advanced Development</i>	2.000	-	-	-	-	-	-	-	-	-	Continuing Continuing

Remarks

D. Acquisition Strategy

The Program produces software prototypes configured for use in programs such as USSTRATCOM's Global Adaptive Planning Collaborative Information Environment (GAP-CIE). The program is executed by a Broad Agency Announcement (BAA) and a targeted Request for Proposals (RFP) process. The BAA and RFPs were issued in FY 2011. Proposals were solicited from all DoD organizations, other federal agencies, and the commercial sector. Proposals were selected using review panels.

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>	Project (Number/Name) P670 / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
<i>iCEWS Delivery Schedule</i>																												
iDATA and iCAST Version 1.1		■	■	■																								
iSENT Version 3.1				■	■	■																						
iDATA Version 1.2				■	■	■	■																					
iCAST Version 1.3, iSENT Version 3.3					■	■	■																					
iDATA Version 1.3, iCAST Version 1.4, and iSENT Version 4.0						■	■	■																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604670D8Z / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>	Project (Number/Name) P670 / <i>Human Social Culture Behavior (HSCB) Modeling Research and Engineering</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>ICEWS Delivery Schedule</i>				
iDATA and iCAST Version 1.1	2	2014	4	2014
iSENT Version 3.1	4	2014	1	2015
iDATA Version 1.2	4	2014	2	2015
iCAST Version 1.3, iSENT Version 3.3	1	2015	2	2015
iDATA Version 1.3, iCAST Version 1.4, and iSENT Version 4.0	2	2015	3	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604775D8Z I <i>Defense Rapid Innovation Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	418.008	175.000	225.000	-	-	-	-	-	-	-	Continuing	Continuing
<i>P775: Defense Rapid Innovation Program</i>	418.008	175.000	225.000	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	175.000	-	-	-	-
Current President's Budget	175.000	225.000	-	-	-
Total Adjustments	-	225.000	-	-	-
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	225.000	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: P775: *Defense Rapid Innovation Program*

Congressional Add: *Defense Rapid Innovation Fund*

	FY 2014	FY 2015
	175.000	225.000
Congressional Add Subtotals for Project: P775	175.000	225.000
Congressional Add Totals for all Projects	175.000	225.000

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P775: Defense Rapid Innovation Program</i>	418.008	175.000	225.000	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015
Congressional Add: Defense Rapid Innovation Fund	175.000	225.000
<p>FY 2014 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. For example, in FY 2011-FY 2012, the emphasis was on responding to urgent operational issues in support of ongoing global operations, including Afghanistan. In FY 2013-FY 2014, requirements migrated to supporting better buying power, providing an avenue for technology innovation and refresh for legacy defense acquisition programs. Some capabilities enabled to date include: 1) the Army Advanced Combat Surveillance Kit, a lightweight, low-power sensor for unattended, localization and tracking of dismounts and vehicles in challenging operational environments; 2) the Navy's Port Security Barrier Intrusion Detection System, which uses an optic-electronic alarm and software system that monitors gates to ensure threats cannot exploit undetected gaps; 3) the Air Force Lightweight Tactical Suitcase Portable Receive Suite, which enables deployed military forces to access global broadcast systems for satellite imagery, weather info, map data, classified and unclassified intelligence; and 4) the US Special Operations Command's Multi-Missile Common Launch Tube, which doubles the number of targets that can be engaged from the same platform, with increased precision that minimizes collateral damage.</p> <p>FY 2015 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 FY2015 Rapid Innovation Fund Program include; 1) Deliver near term, emerging technologies to enhance the</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604775D8Z / <i>Defense Rapid Innovation Program</i>	Project (Number/Name) P775 / <i>Defense Rapid Innovation Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015
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.		
Congressional Adds Subtotals	175.000	225.000

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	418.008	101.850		131.625		-		-		-	-	651.483	-
Subtotal			418.008	101.850		131.625		-		-		-	-	651.483	-

Remarks
 Provided, That of the funds made available in this paragraph, \$225,000,000 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

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	0.000	67.900		86.625		-		-		-	-	154.525	-
Subtotal			0.000	67.900		86.625		-		-		-	-	154.525	-

Remarks
 Provided, That of the funds made available in this paragraph, \$225,000,000 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)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Army, Navy, Air Force, Fourth Estate	C/FFP	Various : Various	0.000	5.250		6.750		-		-		-	-	12.000	-
Subtotal			0.000	5.250		6.750		-		-		-	-	12.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense							Date: February 2015				
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0604775D8Z / <i>Defense Rapid Innovation Program</i>				Project (Number/Name) P775 / <i>Defense Rapid Innovation Program</i>				
	Prior Years	FY 2014	FY 2015		FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	418.008	175.000	225.000		-	-	-	-	818.008	-	

Remarks

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 fourth estate agencies.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604775D8Z / <i>Defense Rapid Innovation Program</i>	Project (Number/Name) P775 / <i>Defense Rapid Innovation Program</i>

**Rapid Innovation Fund (RIF) Program
(Milestones: 2014 Funding Execution)**

As Of: May 22, 2014

Date(s)	Action
January 3, 2014 January 17, 2014	<ul style="list-style-type: none"> • FY 2014 National Defense Authorization Act Signed • FY 2014 Consolidated Appropriations Act Signed
February 1 – May 22, 2014	<ul style="list-style-type: none"> • OSD Issues 2014 Implementation Guidelines • Components develop requirements aligned to Defense-Wide focus areas • OSD & Components collaborate for single BAA prep and establish portal(s) requirements
May 23 – June 23, 2014	BAA Pre-Release in FEBIZOPPs (links posted at other portals / websites) <ul style="list-style-type: none"> • Open period for public discussion with Defense technical PoCs
June 24, 2014 July 9, 2014 July 18, 2014	BAA Opens, Begin Accepting White Papers <ul style="list-style-type: none"> • Public discussion limited to formal questions submitted to RIF Portal Portal closes to new questions Answers to all formal questions posted
August 8, 2014	BAA Closes: White Papers (WPs) due from offerors
NLT December 18, 2014	<ul style="list-style-type: none"> • Components complete WP evaluations • Source selection authority establishes initial priorities & ranking
NLT January 9, 2015	Components notify all offerors & invite full proposals
NLT February 13, 2015	Full proposals due from offerors (about 30 days after invite)
NLT March 20, 2015	Components evaluate full proposals / complete ranking
NLT August 1, 2015	Complete proposal negotiations & contract awards

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604775D8Z / <i>Defense Rapid Innovation Program</i>	Project (Number/Name) P775 / <i>Defense Rapid Innovation Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Army, Navy, Air Force, Fourth Estate	2	2015	4	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	-	12.482	-	-	-	-	-	-	-	Continuing	Continuing
001: <i>Maritime Capability</i>	0.000	-	12.482	-	-	-	-	-	-	-	Continuing	Continuing

MDAP/MAIS Code:
Other 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)	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	12.500	-	-	-
Current President's Budget	-	12.482	-	-	-
Total Adjustments	-	-0.018	-	-	-
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• FFRDC Reduction	-	-0.018	-	-	-

Change Summary Explanation

FY 2014: No change.
 FY 2015: FFRDC Reduction -0.018 million.
 FY 2016: No change.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
001: <i>Maritime Capability</i>	-	-	12.482	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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 2014	FY 2015	FY 2016
Title: Maritime Capabilities Accomplishments and Plans	-	12.482	-
FY 2014 Accomplishments: N/A			
FY 2015 Plans: 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			
Accomplishments/Planned Programs Subtotals	-	12.482	-

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 001 / <i>Maritime Capability</i>
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R4								
PE: 0605170D8Z/ Support to NII								

Funding supports Maritime Capabilities

	10/1/2013	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020
FY2014 Program Execution								
FY2015 Program Execution								
FY2016 Program Execution								
FY2017 Program Execution								
FY2018 Program Execution								
FY2019 Program Execution								
FY2020 Program Execution								

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 001 / <i>Maritime Capability</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY15 Project Execution	1	2015	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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 0303191D8Z I Joint Electromagnetic Technology (JET) Program
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	3.150	2.651	2.660	-	2.660	2.716	2.868	3.047	3.088	Continuing	Continuing
192: Joint Electromagnetic Technology (JET) Program	0.000	3.150	2.651	2.660	-	2.660	2.716	2.868	3.047	3.088	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	3.151	2.656	2.449	-	2.449
Current President's Budget	3.150	2.651	2.660	-	2.660
Total Adjustments	-0.001	-0.005	0.211	-	0.211
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustment	-0.001	-	0.218	-	0.218
• FFRDC Reduction	-	-0.005	-	-	-
• Economic Assumption	-	-	-0.007	-	-0.007

Change Summary Explanation

FY 2014: Program Adjustment -0.001 million.
 FY 2015: FFRDC Reduction -0.005 million.
 FY 2016: Economic Assumption -0.007 million, Program Adjustment 0.218 million.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0303191D8Z / <i>Joint Electromagnetic Technology (JET) Program</i>	Project (Number/Name) 192 / <i>Joint Electromagnetic Technology (JET) Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>192: Joint Electromagnetic Technology (JET) Program</i>	-	3.150	2.651	2.660	-	2.660	2.716	2.868	3.047	3.088	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 2014	FY 2015	FY 2016
Title: JET Program Initiatives	3.150	2.651	2.660
FY 2014 Accomplishments: Program Planning and Support			
FY 2015 Plans: Program Planning and Support			
FY 2016 Plans: Program Planning and Support			
Accomplishments/Planned Programs Subtotals	3.150	2.651	2.660

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0303191D8Z / <i>Joint Electromagnetic Technology (JET) Program</i>	Project (Number/Name) 192 / <i>Joint Electromagnetic Technology (JET) Program</i>
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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering	Various	Various : Various	-	3.150	Jul 2014	2.651	Jul 2015	2.660	Jul 2016	-		2.660	Continuing	Continuing	Continuing
Subtotal			-	3.150		2.651		2.660		-		2.660	-	-	-
Project Cost Totals			-	3.150		2.651		2.660		-		2.660	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0303191D8Z / <i>Joint Electromagnetic Technology (JET) Program</i>	Project (Number/Name) 192 / <i>Joint Electromagnetic Technology (JET) Program</i>
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R4
PE: 0303191D8Z/ *Joint Electromagnetic Technology*

Funding supports the development of Joint Electromagnetic Technologies (JET) that support DoD Special communications and communications assurance.

	10/1/2013	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020
FY2014 Program Execution								
FY2015 Program Execution								
FY2016 Program Execution								
FY2017 Program Execution								
FY2018 Program Execution								
FY2019 Program Execution								
FY2020 Program Execution								

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0303191D8Z / <i>Joint Electromagnetic Technology (JET) Program</i>	Project (Number/Name) 192 / <i>Joint Electromagnetic Technology (JET) Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 Project Execution	1	2014	4	2015
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604161D8Z I <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	26.804	7.859	7.925	8.800	-	8.800	9.390	7.396	6.998	7.138	Continuing	Continuing
P163: <i>Nuclear and Conventional Physical Security</i>	26.804	6.843	3.947	5.128	-	5.128	6.818	7.396	6.998	7.138	Continuing	Continuing
P042: <i>CNT Rad/Nuc Passive Defense SDD</i>	0.000	1.016	3.978	3.672	-	3.672	2.572	-	-	-	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$2.000 million to account for the availability of prior year execution balances.

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604161D8Z I <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	8.109	7.936	6.204	-	6.204
Current President's Budget	7.859	7.925	8.800	-	8.800
Total Adjustments	-0.250	-0.011	2.596	-	2.596
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.250	-			
• Internal realignment	-	-	4.621	-	4.621
• FFRDC	-	-0.011	-	-	-
• Economic Assumption	-	-	-0.025	-	-0.025
• DoD Realignment	-	-	-2.000	-	-2.000

Change Summary Explanation

Internally realigned Procurement funding to this RDT&E Program Element to address additional advanced development for the Joint Personal Dosimeter

NOTE: The FY 2016 funding request was reduced by \$2.000 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P163 / <i>Nuclear and Conventional Physical Security</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P163: <i>Nuclear and Conventional Physical Security</i>	26.804	6.843	3.947	5.128	-	5.128	6.818	7.396	6.998	7.138	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 2014	FY 2015	FY 2016
Title: Detection and Assessment	2.372	1.354	3.138

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Developed prototype for US Navy Spike Weapon System, Improved Electro-optical Seeker • Conducted R&D for the Ground-Based Operational Surveillance System - Expeditionary <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • 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 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • 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 			
<p>Title: Access Controls</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Demonstrated the ability of existing marine mammals to intercept human targets and attach specially developed hardware to delay and deny access to critical resources. • Provided a continuous evaluation solution for DoD personnel security able to support the automated, continuous evaluation of cleared personnel against the Administrative Guidelines and other security risk management criteria, and alert appropriate to supplement and eventually replace periodic re-evaluations <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Develop an access control capability that leverages information housed in local law enforcement databases <p>FY 2016 Plans:</p>	2.210	0.660	1.010

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P163 / <i>Nuclear and Conventional Physical Security</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Continue to develop an access control capability that leverages information housed in local law enforcement databases 			
<p>Title: Installation and Transport Security</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed improved and common situational awareness to link shipboard security teams and shore-based security and response boats. Conducted demonstration for 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. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> 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. 	0.191	0.871	-
<p>Title: Storage and Safeguards</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed RFID Tagging for Items in Extreme Cold Storage (CONUS) <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Develop RFID Tagging for Items in Extreme Cold Storage (OCONUS) 	0.220	0.164	-
<p>Title: Prevention</p> <p>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.</p>	0.339	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed and hosted Nuclear Testing, Diagnostics, Forensics and Stockpile Stewardship Course 			
<p>Title: Decision Support Systems</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Developed capability to ensure threat alert and response systems are interoperable with equipment used by the DoD and mutual aid partners in the local communities <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> 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 <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Continue to 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 	0.918	0.569	0.980
<p>Title: Analytical Support</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> Conducted physical security test and evaluation efforts Provided DoD and industry the means to achieve physical security interoperability <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Conduct physical security test and evaluation efforts Provide DOD and industry the means to achieve PSE interoperability 	0.593	0.329	-
Accomplishments/Planned Programs Subtotals	6.843	3.947	5.128

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P163 / <i>Nuclear and Conventional Physical Security</i>

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 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hand-Held Explosive Detection Equipment for Maritime Operations	MIPR	NAVEODTECH : Indian Head, MD	-	0.840		0.310		-		-		-	-	-	-
Sonar Propagation Acoustics Model Transition to Operational Initial Capability	MIPR	SPAWAR Pacific : San Diego, CA	-	0.642		0.450		-		-		-	-	-	-
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	0.300	1.682		-		-		-		-	-	-	-
Joint Detection & Assessment	TBD	TBD : TBD	-	-		-		2.283		-		2.283	-	-	-
Radar Processing Dynamic Filter	MIPR	SPAWAR Pacific : San Diego, CA	-	0.587		-		-		-		-	-	-	-
Joint Explosive Detection Equipment	TBD	TBD : TBD	-	-		-		1.191		-		1.191	-	-	-
Physical Security Enterprise RDT&E	Various	Various : Various	23.280	-		-		-		-		-	-	-	-
Subtotal			23.580	4.213		0.927		3.474		-		3.474	-	-	-

Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Nuclear Matters Contract Support	MIPR	Washington Headquarters Services : Arlington, VA	-	-		0.650		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Applied Research Laboratories: University of Texas	MIPR	Naval Sea Systems Command : Washington Navy Yard, DC	-	0.328		-		-		-		-	-	-	-
Subtotal			-	0.328		0.650		-		-		-	-	-	-

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Millimeter Wave Asymmetric Threat Detection	MIPR	NAVEODTECH : Indian Head, MD	-	-		0.220		1.344		-		1.344	-	-	-
Comparative Evaluation of Trace Detection Systems for Use at an Entry Control	MIPR	NAVEODTECH : Indian Head, MD	-	-		0.869		-		-		-	-	-	-
Smith Detection's HazMatID Elite and HazMatID 360	MIPR	NAVEODTECH : Indian Head, MD	0.384	0.417		-		-		-		-	-	-	-
Subtotal			0.384	0.417		1.089		1.344		-		1.344	-	-	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Security Equipment Integration Working Group	MIPR	SPAWAR Atlantic : Charelston, SC	2.131	0.963		0.750		-		-		-	-	-	-
ePSEAG (program management tool) / PSEAG Website	MIPR	AF Civil Engineering Center : Panama City, FL	0.558	0.464		0.531		0.310		-		0.310	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense												Date: February 2015		
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)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JASON Study	MIPR	Washington Headquarters Services : Arlington, VA	0.151	0.458		-		-		-		-	-	-	-
Subtotal			2.840	1.885		1.281		0.310		-		0.310	-	-	-

Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	26.804	6.843	3.947	5.128	-	5.128	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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

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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
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:**
- 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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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2016 Office of the Secretary Of Defense		Date: February 2015
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

Sensor Fusion 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
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:**
- 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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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P163 / <i>Nuclear and Conventional Physical Security</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Detection & Assessment Integrated Process Team</i>				
Detection & Assessment Integrated Process Team	4	2014	4	2016
<i>Joint Explosive Detection Equipment</i>				
Joint Explosive Detection Equipment	1	2014	1	2020
<i>Hailing Acoustic, Laser and Light Tactical System</i>				
Hailing Acoustic, Laser and Light Tactical System	1	2014	1	2015
<i>Handheld Explosive Detection System for Maritime Environment</i>				
Handheld Explosive Detection System for Maritime Environment	2	2014	3	2015
<i>Radar Processing Dynamic Structure Filter</i>				
Radar Processing Dynamic Structure Filter	4	2014	4	2016
<i>Radio Frequency Identification Technology in Biological Specimen Labels</i>				
Radio Frequency Identification Technology in Biological Specimen Labels	2	2014	4	2015
<i>Sonar Propagation Acoustics Model Transition to Operational Initial Capability</i>				
Sonar Propagation Acoustics Model Transition to Operational Initial Capability	3	2014	3	2016

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P042: CNT Rad/Nuc Passive Defense SDD	-	1.016	3.978	3.672	-	3.672	2.572	-	-	-	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 2014	FY 2015	FY 2016
Title: CNT Rad/Nuc Passive Defense	1.016	3.978	3.672
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 2014 Accomplishments: Developed of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)			
FY 2015 Plans: 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:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Continue with the development of Joint Radiological and Nuclear passive defense systems (i.e. Radiological Detection System and the Joint Personal Dosimeter)			
Accomplishments/Planned Programs Subtotals	1.016	3.978	3.672

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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	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
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

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604161D8Z / <i>Nuclear and Conventional Physical Security/Countering Nuclear Threats</i>	Project (Number/Name) P042 / <i>CNT Rad/Nuc Passive Defense SDD</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Radiological Detection System</i>				
Radiological Detection System	1	2014	2	2019
<i>Joint Personal Dosimeter</i>				
Joint Personal Dosimeter	4	2014	1	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0604165D8Z I Prompt Global Strike Capability Development
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	825.537	63.491	95.626	78.817	-	78.817	183.905	205.561	224.174	227.206	Continuing	Continuing
P164: Hypersonic Glide Experiment and Concepts Demonstration Support	364.970	3.305	2.000	2.000	-	2.000	2.000	2.000	2.000	2.000	Continuing	Continuing
P166: Alternate Re-Entry System/Warhead Engineering	361.276	59.986	90.064	72.950	-	72.950	176.187	199.252	218.117	221.000	Continuing	Continuing
P167: Test Range Development	62.446	-	-	1.000	-	1.000	2.000	1.000	1.000	1.000	Continuing	Continuing
P168: OSD CPGS Studies	36.845	0.200	3.562	2.867	-	2.867	3.718	3.309	3.057	3.206	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 2016, 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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	65.393	70.762	79.348	-	79.348
Current President's Budget	63.491	95.626	78.817	-	78.817
Total Adjustments	-1.902	24.864	-0.531	-	-0.531
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	25.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.289	-			
• SBIR/STTR Transfer	-1.613	-			
• FY 2016 baseline adjustment	-	-	-0.531	-	-0.531

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense Date: February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: Research, Development, Test & Evaluation, Defense-Wide / BA 5: System Development & Demonstration (SDD)	PE 0604165D8Z / Prompt Global Strike Capability Development

• FFRDC Reduction	-	-0.136	-	-
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Change Summary Explanation

Program baseline realigned by the department for other priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 5					R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>				Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P164: <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>	364.970	3.305	2.000	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 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 2016, 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 2014	FY 2015	FY 2016
Title: Hypersonic Glide Experiments and Concept Demonstration Development/Support	3.305	2.000	2.000
<p>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.</p> <p>The objectives of this sub-project are to:</p> <ul style="list-style-type: none"> - Assess boost-glide technologies in light of ground and flight test events and associated modeling and simulation. - Analyze the military utility of multiple, 3-axis stabilized vehicles performance with respect to thermal protection materials, aerodynamics and control surfaces, navigation, guidance, control (NG&C), boosters, and weapons performance. - Assess the feasibility of producing an affordable solution to fill the CPGS capability gap. - Continue systems definition/engineering/development of integrated weaponized payload delivery vehicles and subsystems in order to identify and reduce risks and mature technologies for a potential extended range acquisition program. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p><i>FY 2014 Accomplishments:</i></p> <ul style="list-style-type: none"> - Analyzed developmental test results in the areas of aerodynamics, aerothermodynamics, guidance, navigation, and control, instrumentation, vehicle recovery, and propulsion. - Conducted planning of flight tests in coordination with other Services to validate knowledge base garnered from enhanced developmental testing. - Continued trade studies to evaluate system alternatives, affordability, end-to-end system concepts and industrial manufacturing readiness. - Continued risk reduction and technology maturation efforts through ground tests to improve modeling and simulation capabilities and technology readiness to subsystems. - Continued work on Technology Development Strategy and system engineering documentation, incorporating CPGS community data, trade studies and on-going risk reduction/technology development efforts. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - 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 - Complete 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 <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - 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 - Conduct 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 			
Accomplishments/Planned Programs Subtotals	3.305	2.000	2.000

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>

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-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>
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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hypersonic Glide Experiment Support	Allot	Space and Missile Center : Los Angeles, CA	364.970	3.305		2.000		2.000		-		2.000	-	-	-
Subtotal			364.970	3.305		2.000		2.000		-		2.000	-	-	-
Project Cost Totals			364.970	3.305		2.000		2.000		-		2.000	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>

Hypersonic Glide Experiment Support

Trade Studies, Ground Testing and Systems Engineering	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P164 / <i>Hypersonic Glide Experiment and Concepts Demonstration Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Hypersonic Glide Experiment Support	1	2014	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 5					R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>				Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P166: <i>Alternate Re-Entry System/Warhead Engineering</i>	361.276	59.986	90.064	72.950	-	72.950	176.187	199.252	218.117	221.000	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 2016, 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 2014	FY 2015	FY 2016
Title: Alternative Re-Entry System/Warhead Engineering and Delivery Vehicle Options/Development	59.986	90.064	72.950
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 2014 Accomplishments:			
- Completed manufacturing and testing of Hypersonic Glide Body and Booster to be used in AHW Flight Test 2			
- Conducted pre-shipment and pre-launch reviews for AHW Flight Test 2			
- Deployed to range, conducted pre-launch testing and training			
- Executed AHW Flight Test 2 launch attempt			
- Began post-test data analysis for AHW Flight Test 2 and initiated Failure Review Board to investigate launch anomaly			
- Continued ground testing and development of advanced thermal protection materials and concepts			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Completed System Requirements Review through collaboration with the national CPGS team for the next CPGS Flight Experiment 1 (FE-1) in FY 2017 using a scaled AHW glider - Completed intermediate range KEP warhead sled test Preliminary Design Review - Began planning for fabrication of prototype miniaturized hardware in support of FE-1 with broad applicability across all CPGS concepts <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - Continue AHW Flight Test 2 post-Flight test data analysis and complete Failure Review Board - Complete Preliminary Design Review for FE-1 through collaboration with the national CPGS team - Complete Critical Design Review for FE-1 through collaboration with national CPGS team - Complete intermediate range KEP warhead sled test Critical Design Review - Complete KEP warhead arena test - Conduct intermediate range KEP warhead sled test, analyze test data, and disseminate data to CPGS community - 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 <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - Continue manufacturing and testing of Hypersonic Glide Body and Booster to be used in FE-1 - Begin intermediate range booster development with competitive industry - 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	59.986	90.064	72.950

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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>

CPGS Flight Experiment 1

	FY 2014				FY 2015				FY 2016				FY 2017			
	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																

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>

CPGS Flight Experiment 2

	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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																				

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>

Intermediate Range Kinetic Energy Projectile (KEP) Warhead Sled Test

	FY 2014				FY 2015				FY 2016			
	1	2	3	4	1	2	3	4	1	2	3	4
Planning/Design												
Fabrication & Test Execution												
Post-Test Analysis/Reporting												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P166 / <i>Alternate Re-Entry System/Warhead Engineering</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Navy Flight Experiment 1	1	2014	4	2017
Navy Flight Experiment 2	4	2017	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P167 / <i>Test Range Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P167: <i>Test Range Development</i>	62.446	-	-	1.000	-	1.000	2.000	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 2016, 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 2014	FY 2015	FY 2016
Title: Test Range Development	-	-	1.000
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 2014 Accomplishments: - Funding for this activity in FY 2014 has been executed out of Project Code 166 as part of the CPGS flight test programs			
FY 2015 Plans: - Funding for this activity in FY 2015 has been executed out of Project Code 166 as part of the CPGS flight test programs			
FY 2016 Plans: - Improve telemetry collection and range safety infrastructure in preparation for future flight testing of system concepts - Support test range infrastructure for long term use			
Accomplishments/Planned Programs Subtotals	-	-	1.000

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P167 / <i>Test Range Development</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P167 / <i>Test Range Development</i>

Test Range Development

Support Range Safety and Telemetry Efforts	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P167 / <i>Test Range Development</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Test Range Development	1	2014	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P168 / <i>OSD CPGS Studies</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P168: <i>OSD CPGS Studies</i>	36.845	0.200	3.562	2.867	-	2.867	3.718	3.309	3.057	3.206	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 2016, 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 2014	FY 2015	FY 2016
Title: OSD CPGS Studies	0.200	3.562	2.867
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Conducted mid-term demonstrations in support of AHW Flight Test 2 to include operational overlay - Conducted command, control, and operational overlay exercises in parallel with CPGS flight tests - Continued senior steering group panel review and strategic messaging activities <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Conduct cost assessment studies for future system development - Conduct booster system integration studies - Conduct lethality and warhead fuzing studies - Continue thermal and aerodynamic modeling and simulation - Continue senior steering group panel review and strategic messaging activities 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P168 / <i>OSD CPGS Studies</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Continue program management reviews, ground test status and planning summits, and administrative support of ground test integrated product teams <i>FY 2016 Plans:</i> - Continue cost assessment studies for future system development - Continue lethality and warhead fuzing studies - 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	0.200	3.562	2.867

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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P168 / <i>OSD CPGS Studies</i>

CPGS Studies

Project Management, Studies, Analyses, Operational Assessments and Acquisition Planning	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604165D8Z / <i>Prompt Global Strike Capability Development</i>	Project (Number/Name) P168 / <i>OSD CPGS Studies</i>

Schedule Details

Events	Start		End	
	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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0604771D8Z I Joint Tactical Information Distribution System (JTIDS)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	35.111	16.938	17.537	14.285	-	14.285	16.521	16.209	14.802	15.002	Continuing	Continuing
771: Link-16 Tactical Data Link (TDL) Transformation	35.111	16.938	17.537	14.285	-	14.285	16.521	16.209	14.802	15.002	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The FY 2016 funding request was reduced by \$1.280 million to account for the availability of prior year execution balances.

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. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	17.423	17.562	15.667	-	15.667
Current President's Budget	16.938	17.537	14.285	-	14.285
Total Adjustments	-0.485	-0.025	-1.382	-	-1.382
• Congressional General Reductions	-	-0.025			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.485	-			
• Baseline Adjustments	-	-	-1.382	-	-1.382

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604771D8Z I <i>Joint Tactical Information Distribution System (JTIDS)</i>
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Change Summary Explanation

Reductions reflect baseline reductions to the FY 2016 program.

NOTE: The FY 2016 funding request was reduced by \$1.280 million to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Common Joint Tactical Information Initiatives</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Cyber Investment Management: Synchronized and coordinated cyberspace acquisition activities, conducted quantitative assessments, and ensured cyberspace investments aligned with Department priorities, required capabilities and evolving cyber threats. Provided support of the Cyber Investment Management Board and developed implementation guidance and associated direction. Planned and 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 to include return on investment and risk ultimately leading to an optimization phase focusing on process improvement. - Conducted investment analysis of the DoD-wide Cyber Special Access Program (SAP) portfolio. - Conducted Cyber Rapid Acquisition Process Pilots to allow insight into timelines and potential areas of improvement for new rapid cyber acquisition processes. - Utilized the results of the Process Pilots to implement the new rapid cyber acquisition processes across DoD. - Completed development and implementation of Cyber security Guidebook for Program Managers. Contributed to all follow on efforts to revise policy or guidance regarding Cyber security within the Acquisition process. - Completed the Cyber Situational Awareness EoA (phase I) and commenced work on phase II with a focus on Defend the Nation (DTN) mission. - Defined future Cyber Range Enterprise and the need for an Executive Agent. Conducted technical analysis and assessment of cyber range capabilities and capacity versus need. Developed 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. - Conducted OCO/DCO Requirements and Architecture Analysis in collaboration with USCYBERCOM: supported flow of requirements from Cyber Attack ICD and CND IDC to more detailed requirements for OCO and DCO capabilities in support of IS-CDD development; developed and refined OCO / DCO architectures. - DASD Acquisition Oversight Support: Provided technical assessments and programmatic recommendations across DASD functional areas to address interoperability gaps and work early in the systems engineering and development processes to minimize gaps as systems are delivered and updated. 	16.938	17.537	14.285

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604771D8Z I <i>Joint Tactical Information Distribution System (JTIDS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>- Common Data Link (CDL) Principal Staff Assistant: Coordinated with CDL Executive Agent to develop a technology roadmap and terminal database to improve interoperability, configuration management, and focused technology investments. Oversaw development and validation of documentation for Remote Video Terminal (RVT) waveforms to enable competition of CDL procurements. Began development of transition strategy to converge on a DoD standard for tactical ISR communications. Initiated planning and conduct of CDL Senior Review Panel (SRP) and Integrated Product Team (IPT) meetings to develop and refine the CDL investment portfolio and to identify strategic ISR communications issues the DoD will face in the future.</p> <p>- Tactical Data Links (TDLs) - Identified open architecture improvements to TDLs to improve competition and shorten technology upgrade cycles. Developed upgrade paths for TDLs to maintain Air Dominance in contested environments. Assessed new technologies including RF directional mesh with potential to improve data rates and jamming resistance in tactical environments</p> <p>- Protected SATCOM AoA: Conducted analysis necessary to ensure the Department of Defense (DoD) pursues the most suitable alternative for providing space-based protected satellite communications services. The goal of the AoA is to facilitate high caliber analysis, fair treatment of options, and decision-quality outcomes to inform the MDA at the next Milestone and shape/scope the RFP for the next acquisition phase- MUOS System End-to-End Integration: Developed comprehensive systems engineering, test and terminal certification plans. Assessed military standard/specifications and interface control documents for configuration management. Engineered the system to minimize efforts required to certify new MUOS end user terminals.</p> <p>-Participated in the EA4S led Narrowband Satellite Communication Study focused on the successor to the existing Mobile User Objective System (MUOS). Successfully steered this study to open its aperture and address near term narrowband synchronization issues. Envisioned and commenced orchestration of an initiative to resolve the near term synchronization challenge.</p> <p>- FAB T: Provided 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 prepared for staffing Acquisition Strategy, Milestone C DAB preparation, ADMs, ICE, APB, TEMP, and SEP as well as other acquisition documents. Supported the selection of a single procurement contractor.</p> <p>- Advanced Extremely High Frequency (AEHF): Assumed OIPT lead responsibilities for AEHF. Worked through a Deep Dive into the Mission Planning Subsystem (MPS) related delays in the program that led to a breach in the IOC. Also worked with the program office and AT&L staff to close out action items related to the new AEHF Crypto Key Integration effort.</p> <p>- Enhanced Polar System (EPS): Assumed OIPT lead responsibilities for EPS. Worked through a Milestone B DAB and coordinated an ADM which authorized the TT&C portion of the program to enter into a full scale development contract, and delegate the program to the Air Force.</p> <p>- 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 recommend 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.</p>			

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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604771D8Z <i>I Joint Tactical Information Distribution System (JTIDS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 recommend program performance improvement options to meet cost, schedule and performance objectives. Provided a technical assessment of full and open competition process for MNVR radios. - Provided assessments of DoD Business System 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. - Dismounted Tactical Edge Mobile Applications: Characterized current performance (bandwidth, latency, jitter, persistence) of disadvantages intermittent low bandwidth tactical links based on measured SRW and narrowband SATCOM performance. - Ground/Air/Space integrated Networks Performance Assessment: Facilitated the development and analysis of waveform capabilities. Evaluated new waveform technologies, wireless communications waveform development and management. Performed technical assessments of onboard processing on UAS systems to reduce demand for communications link bandwidth and identify accelerated methods to achieve certified test data for non-developmental products. - Aerial Networks Roadmaps and Systems Engineering: Developed roadmaps to address air-ground/air-space domain. Evaluated Army, Navy, Air Force system architectures for alignment with aerial networks roadmaps. Developed detailed risk reduction and technology maturation investment plans to accelerate fielding of advanced TDLs to 5th generation fighters. - Ground Tactical Networks Advanced Capabilities: Developed narrowband capability to enable dismounted troops to operate in jungle canopy, support agile division-wide task reorganization and close air support while reducing network management forward support footprint. - Integrated Electromagnetic Spectrum Operations (EMSO): Built a technical development strategy for co-architecting Electronic Warfare (EW) and radio devices to enable integrated EMSO to improve EM battlespace awareness, ensure agile response to changing adversary threats and reduce costs of combined capabilities. Tri-chaired DoD Electromagnetic Spectrum Roadmap and Action Plan Senior Steering Group. Roadmap and plan defined over 60 actions and 300 tasks needed to develop key technologies, and improve DoD management and use of the electromagnetic spectrum. - Commercial Satellite Communications (COMSATCOM): Co-led study to assess ways to better use COMSATCOM to meet DoD wideband SATCOM requirements. Identified near-term planning, funding, acquisition, and management improvements needed to enable multi-year procurement of COMSATCOM services in response to FY14 National Defense Authorization Act direction. - Warfighter Information Network - Tactical (WIN-T): Assessed complexity of Soldier Network Extension (SNE) and Point of Presence (PoP) to address complexity and usability issues identified during operational testing. Identified applications to improve the company commander's effectiveness in using SATCOM terminals in the SNE. - National Leadership Command Capability (NLCC): Assumed 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). Worked directly with the Executive Secretariat (DOD CIO) to oversee all aspects of preparation and conduct of CONLC3S meetings, 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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 led review process for several NLCC related documents including the NC2 ICD, NC2 CONOPS, NLCC Reference Architecture, NLCC Strategic Concept, and others.</p> <ul style="list-style-type: none"> - Joint C2 Portfolio Management: Supported development, integration and test activities across the Services, Agencies and Combatant Commands and delivered the FY15-20 version of the Joint C2 Sustainment and Modernization Plan. - Adaptive Planning and Execution (APEX): Provided management oversight of APEX acquisition activities and authoritative data sources as the APEX technical integrator. Updated the APEX technical architecture to better integrate operational, logistics and intelligence planning with force projection and execution. Updated APEX data architecture and standards and synchronize with APEX framework for application across DoD. - C2 Data: Provided technical expertise for ensuring C2 data is 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 to 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. - Acquisition Management: Provided technical assistance in developing IT related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statute, regulation and management direction. -Space Access: Conducted SATOPS modernization assessment; conducted AFSCN Event-driven Net Centric Review/Technical Assessment. - Environmental Monitoring: Developed DoD inputs for annual Federal Plan for Meteorological Services and Supporting Research; Lead METOC Data Denial Implementation team; Developed METOC/Weather Enterprise Strategy and Roadmap implementing results of Defense Weather Analysis of Alternatives (AoA); conducted assessment of USG weather satellite common ground system compliance with DoD Data Denial requirements; DoD Lead on Antarctic treaty activities at McMurdo Station, Antarctica; implemented METOC data strategy; implemented DoD National Space Weather Strategy - Space Control/Space C2/SSA: Completed GEO SSA Architectural/Cost-Benefit Analysis. Developed and published study outlining approaches for use of civil and international sources of SSA data in military operations. Supported and facilitated increased cyber testing of the JMS program. Evaluated and updated as necessary Enterprise Strategy & Roadmap for Space Control Mission Area. Increased interface with intelligence community especially related to vulnerability assessments. - Non-Intelligence Space Programs Technical Assessments: Performed cyber vulnerability assessments on space, PNT, and METOC programs, including JMS, GPS, OCX, AFSCN, MGUE and others. Reviewed system design documents, control plans, remote management control ports and methods. Recommended 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 			

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C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>on to include data strategies, systems engineering, risks and mitigations. Supported acquisition milestone decisions for programs including Weather System Follow-on, Launch Vehicle New Entrants, and SSBS follow-on activities.</p> <ul style="list-style-type: none"> - PNT Programs Technical Assessments: Took over OIPT lead for the PNT mission area. Conducted Annual GPS Enterprise Review to review synchronization of GPS III, MGUE, and OCX programs. Performed analysis of individual major defense acquisition programs to balance cost, schedule, and performance to deliver PNT capability to combatant users in a responsive manner. Conducted deep dive technical analyses to understand all phases of the GPS enterprise programs. Reviewed PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. Supported/facilitated DASD-level deep dive of OCX program. - PNT Portfolio Management: Took over OIPT lead for the PNT mission area. Developed recommendations for USD approval on acquisition strategies and satellite purchases. Implemented GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Implemented NAVWAR Investment Strategy and Roadmap as well as material in support of major program milestones and internal OSD reviews. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - 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. - Oversee implementation of the Cyber Situational Awareness Evaluation of Alternatives (EoA) (phase I and II) recommendations. - Conduct EoA on Cyber Command and Control to determine C2 tools for Cyber Operations. - Assess, develop report and provide recommendations on Cyber vulnerabilities of Department of Defense weapon systems and tactical communications systems; provide report to Congress and begin implementation of recommendations to ensure Platform Resilience/Mission Assurance (PR/MA). - Enact a Cyber Range Focal point to be the central coordination point and oversight for Cyber Ranges that support Cyber Training and Testing & Evaluations. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 and conduct a EoA for Cyber Range capabilities. - Conduct OCO/DCO Requirements and Architecture Analysis in collaboration with USCYBERCOM: support 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; develop and refine OCO / DCO architectures as required to support equipping of the cyber mission force. - 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 to oversee development and validation of documentation for Remote Video Terminal (RVT) waveforms to enable competition of CDL procurements. Continue development of transition strategy to converge on a DoD standard for tactical ISR communications. 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 statute, 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: Continue 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 prepare for staffing Acquisition Strategy, Milestone C DAB preparation, ADMs, ICE, APB, TEMP, and SEP as well as other acquisition documents. - 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 completes DT&E and enters dedicated OT&E phases of MOT&E, and fielding of the Mission Planning Element. - 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 program goes through its Critical Design Review process. - National Leadership Command Capability (NLCC): Continue 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). 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. - MUOS AoA Support: Provide technical and programmatic analysis and insights in support of C3CB oversight of the MUOS risk reduction efforts, Multi-Service OT&E and follow-on development and operational test activities. Support C3CB contribution to the 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>narrowband requirements review. Provide C3CB with technical expertise in the development of the narrowband AOA Guidance and Plan and to support C&N co-lead of the narrowband AoA.</p> <ul style="list-style-type: none"> - 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. - Mid-Tier Networking Vehicular Radio (MNVR) JTRS: Assess the MNVR 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. - 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. - Provide assessments of DoD Business System programs 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. - 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. FY15 focus will be on selected communications systems. - Tactical Data Link Modernization: Continue TDL improvements to enable U.S. Air Dominance capabilities. Coordinate DEPSECDEF instruction for standup of Executive Agent (EA) for Air Warfare. Begin first phase of Link 16 evolution plans. Complete open architecture implementation of MADL Lob Observable (LO) waveform. Mature common next generation open architecture TDL terminal design. Perform continued oversight of NEW weapons and develop policy/guidance to manage export control of associated TDL. - Warfighter Information Network – Tactical (WIN-T): Provide 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. Review and track soldier feedback and test results to assess corrections to deficiencies 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>identified during the previous FOT&E. Track and monitor the performance of the Inc 3 Network Operations Build 3/4, NetCentric Waveform 10.x and Highband Networking Waveform 3.0 capabilities.</p> <ul style="list-style-type: none"> - 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. Present to Senior Advisory Group for review and approval. - Joint C2 Portfolio Management: Support 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: 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 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: Provide conceptual foundation, metrics and empirical evidence to operationalize Agile C2. Provide technical support to US participation in NATO and other international C2 research efforts. - 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 IT related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statute, regulation and management direction. - Space Ops: Conduct SATOPS Modernization technical assessments; provide technical Oversight/AFSCN Modernization Implementation; conduct AFSCN Event Driven Net Centric Review/Technical Assessment. - 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 Control/Space C2/SSA: Perform continued monitoring of cyber testing and cyber vulnerabilities of critical space programs. Support SSI as OIPT lead for space control programs. - Non-Intelligence Space Programs Technical Assessments: Perform cyber vulnerability and cyber suitability assessments on space, PNT, and METOC programs, including EELV, SBSS Follow on, Space Fence, and others. Review system design documents, control plans, remote management control ports and methods. Recommend corrective actions to specific space, 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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 System Follow-on, Launch Vehicle New Entrants, and SSBS follow-on activities.</p> <ul style="list-style-type: none"> - 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. Review PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. - PNT Portfolio Management: Continue implementation of GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Continue implementation of NAVWAR Investment Strategy and Roadmap as well as material in support of major program milestones and internal OSD reviews. <p>FY 2016 Plans:</p> <p>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.</p> <ul style="list-style-type: none"> - 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. - Oversee implementation of the Cyber Situational Awareness EoA (phase I and II) recommendations. - Oversee implementation of the Cyber Command and Control (C2) EoA recommendations for C2 tools supporting Cyber Operations. - 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. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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. - 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 to oversee development and validation of documentation for Remote Video Terminal (RVT) waveforms to enable competition of CDL procurements. Continue development of transition strategy to converge on a DoD standard for tactical ISR communications. 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 statute, 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. - Wideband AoA Support: Support an AoA to determine future wideband SATCOM (MILSATCOM and COMSATCOM) to include planning, organizing and conducting the AoA as assigned. - 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. - 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. - 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. - MUOS AoA Support: Provide technical and programmatic analysis and insights in support of C3CB oversight of the completion of the MUOS Multi-Service OT&E and follow-on development and operational test activities. Continue to support C3CB 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>contribution to the narrowband requirements review. Continue to provide C3CB with technical expertise to support C&N co-lead of the narrowband AoA</p> <ul style="list-style-type: none"> - 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. Review and track Rifleman Radio IOT&E results and assess correction to deficiencies. Track and monitor the performance of both Rifleman and Manpack capabilities. - 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. - 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. - Provide assessments of DoD Business System programs 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. - 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 Air Warfare Communications 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). 			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604771D8Z <i>I Joint Tactical Information Distribution System (JTIDS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 IT related acquisition policy, including updates to DoD Series 5000 necessitated by changes in statute, regulation and management direction. - Space Ops: Conduct SATOPS Modernization technical assessments; provide technical Oversight/AFSCN Modernization Implementation; conduct AFSCN Event Driven Net Centric Review/Technical Assessment. - 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 Control/Space C2/SSA: Perform continued monitoring of cyber testing and cyber vulnerabilities of critical space programs. Support SSI as OIPT lead for space control programs. - Non-Intelligence Space Programs Technical Assessments: Perform cyber vulnerability and cyber suitability assessments on space, PNT, and METOC programs, including EELV, SBSS Follow on, Space Fence, 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, Launch Vehicle New Entrants, and SSBS 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 			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604771D8Z <i>I Joint Tactical Information Distribution System (JTIDS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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. Review PNT programs for data strategies, systems engineering, risks and mitigations in support of milestone decisions. - PNT Portfolio Management: Continue implementation of GPSEM/PNT Assurance Investment Strategy and Roadmap, ensuring AoA recommendations are addressed. Continue implementation of NAVWAR Investment Strategy and Roadmap as well as material in support of major program milestones and internal OSD reviews.			
Accomplishments/Planned Programs Subtotals	16.938	17.537	14.285

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. 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.

F. Performance Metrics

Enterprise-Wide Alignment: Accelerate DoD information age transformation to increase the effectiveness and efficiency of the warfighting, intelligence and business missions.

Measures:

- 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

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / <i>Joint Tactical Information Distribution System (JTIDS)</i>	Project (Number/Name) 771 / <i>Link-16 Tactical Data Link (TDL) Transformation</i>
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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Link-16 Tactical Data Link (TDL) Transformation	C/TBD	OUSD(AT&L)/ OASD(A)/ DASD(C3CB) : Pentagon	35.111	16.938		17.537		14.285		-		14.285	-	-	-
Subtotal			35.111	16.938		17.537		14.285		-		14.285	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		35.111	16.938	17.537	14.285	-	14.285	-	-

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / <i>Joint Tactical Information Distribution System (JTIDS)</i>	Project (Number/Name) 771 / <i>Link-16 Tactical Data Link (TDL) Transformation</i>
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FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
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

Link-16 Comm Tactical Data Link (TDL) Transformation	
Contract Awards	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0604771D8Z / <i>Joint Tactical Information Distribution System (JTIDS)</i>	Project (Number/Name) 771 / <i>Link-16 Tactical Data Link (TDL) Transformation</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Link-16 Comm Tactical Data Link (TDL) Transformation</i>				
Contract Awards	2	2014	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605022D8Z I <i>Defense Exportability Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	3.570	3.640	3.238	3.273	-	3.273	3.360	3.236	3.113	3.155	Continuing	Continuing
P013: <i>Defense Exportability Features (DEF) Program</i>	3.570	3.640	3.238	3.273	-	3.273	3.360	3.236	3.113	3.155	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Exportability Features (DEF) 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 is increased in FY 2016 to support an expansion of the number of designated systems included in the Defense Exportability Pilot Program and the greater costs of designing in technology protection. A number of designated systems participating in the DEF Pilot Program in FY16 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 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, increase quality and timely deliveries to allies and friends, and enhance US industry share of the global marketplace.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605022D8Z / <i>Defense Exportability Program</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	3.750	3.244	3.295	-	3.295
Current President's Budget	3.640	3.238	3.273	-	3.273
Total Adjustments	-0.110	-0.006	-0.022	-	-0.022
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-0.006			
• SBIR/STTR Transfer	-0.110	-			
• Baseline Program Adjustment	-	-	-0.022	-	-0.022

Change Summary Explanation

Program was minimally reduced for higher priorities within the department.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P013: Defense Exportability Features (DEF) Program	3.570	3.640	3.238	3.273	-	3.273	3.360	3.236	3.113	3.155	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Exportability Features (DEF) 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. Incorporation of defense exportability features in initial designs can help control costs throughout the product life cycle.

Funding in FY 2016 to support systems included in the Defense Exportability Pilot Program that are used to define and implement DEF 'best practice' program management, system engineering, and program 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, increase quality and timely deliveries to allies and friends, and enhance US industry share of the global marketplace.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Exportability Features (DEF) Program	3.640	3.238	3.273
FY 2014 Accomplishments: - Funding was increased in FY 2014 to expand the number of systems included in the Defense Exportability Pilot Program that are used to define and implement DEF 'best practice' program management, system engineering, and program protection measures in the DoD acquisition process.			
Initiated or continued contracts for DEF feasibility studies or design analysis on the following seven systems:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / <i>Defense Exportability Program</i>	Project (Number/Name) P013 / <i>Defense Exportability Features (DEF) Program</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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) - Three-Dimensional Expeditionary Long-Range Radar (US Air Force) - Common Joint Proximity Height of Burst Fusing (US Army) - Common Infrared Countermeasures (US Army) - Reviewed of major defense acquisition programs for exportability as part of the major milestone review process. - Identified new pilot candidates from military department nominations. - Identified Service leads and subject matter experts, to provide support to programs, prior to Milestone B, to develop plans for exportability features. - Implemented DOD procedures for the recoupment of the DEF investment in program protection through future foreign military sales. - Managed and tracked the completion of the contractor feasibility studies for exportability. - Reviewed contractor feasibility study Interim Progress Reviews and Final Reports for thoroughness, lessons learned, and best practices. - Drafted a legislative amendment adjusting the government/contractor cost-sharing ratio from 50%-50 to an "appropriate share." - Began drafting a DEF Policy Implementation Memorandum. - For both 3DELRR and CIRCM, requirements or options to fund DEF designs were included in their Requests for Proposals (RFPs), either as CLINs or CLIN Options. - Drafted and submitted the annual report to Congress on the program. <i>FY 2015 Plans:</i> - Funding is decreased in FY 2015 as Military Departments concentrated on follow-on DEF studies of select DEF programs, from feasibility studies to design analysis. Initiate or continue contracts for DEF feasibility studies on the following eleven systems (plus any DEF Pilot Programs selected by OSD for FY 2015): - Air and Missile Defense Radar (US Navy) - Indirect Fires Protection Capability (US Army) - Integrated Air and Missile Defense (US Army) - P-8A Poseidon Multi-Mission Maritime Aircraft (US Navy) - Joint Air-to-Surface Standoff Missile (US Air Force) 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / <i>Defense Exportability Program</i>	Project (Number/Name) P013 / <i>Defense Exportability Features (DEF) Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 Joint Proximity Height of Burst Fusing (US Army) - Common Infrared Countermeasures (US Army) - Joint Air to Ground Missile (US Army) <ul style="list-style-type: none"> - Review of major defense acquisition programs for exportability as part of the major milestone review process. - Identify new pilot candidates from Military Department nominations. - Identify Service leads and subject matter experts, to provide support to programs, prior to Milestone B, to develop plans for exportability features. - Manage and track the completion of the contractor feasibility studies for exportability. - Complete and publish OSD DEF Policy Implementation Memorandum and Guidelines. - Oversee drafting of DEF Lessons Learned from MQ-9 and JASSM, and Interim Progress Reviews and Final Reports from IAMD, P-8A, SDB II, 3DELRR, MQ-4C, and HOBf. - Draft and submit the annual report to Congress on the program. <p>The focus for FY 2015 for the DEF pilot program will be 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 will define the required actions for identifying the feasibility of DEF for programs and beginning DEF designs on select designated programs, and to assess the potential costs of those actions. OUSD (AT&L) will continue to engage with program offices through the Military Departments, and to serve 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, the DEF feasibility studies will be addressed in the Acquisition Strategy and the Program Protection Plan (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 are executed.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Funding will be increased in FY 2016 to expand the number of systems included in the Defense Exportability Pilot Program that are used to define and implement DEF 'best practice' program management, system engineering, and program protection measures in the DoD acquisition process, and to cover more expensive follow-on DEF incorporation into export designs. <p>Initiate or continue contracts for DEF feasibility studies on the following eleven systems (plus any DEF Pilot Programs selected by OSD for FY 2015 - 2016):</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / <i>Defense Exportability Program</i>	Project (Number/Name) P013 / <i>Defense Exportability Features (DEF) Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Air and Missile Defense Radar (US Navy) - Indirect Fires Protection Capability (US Army) - Integrated Air and Missile Defense (US Army) - P-8A Poseidon Multi-Mission Maritime Aircraft (US Navy) - Joint Air-to-Surface Standoff Missile (US Air Force) - 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 Joint Proximity Height of Burst Fusing (US Army) - Common Infrared Countermeasures (US Army) - Joint Air to Ground Missile (US Army) - Review of major defense acquisition programs for exportability as part of the major milestone review process. - Identify new pilot candidates from Military Department nominations. - Identify Service leads and subject matter experts, to provide support to programs, prior to Milestone B, to develop plans for exportability features. - Manage and track the completion of the contractor feasibility studies for exportability. - Oversee drafting of DEF Lessons Learned from MQ-9, and Interim Progress Reviews and Final Reports from DEF studies conducted in FY 2015. - Draft and submit the annual report to Congress on the program. 				
Accomplishments/Planned Programs Subtotals		3.640	3.238	3.273
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
TBD				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Height of Burst Fuzing Defense Exportability Features (DEF) Program	MIPR	Picatinny Arsenal : NJ	0.906	1.242		0.914		1.202		-		1.202	Continuing	Continuing	-
Three Dimensional Extended Long Range Radar (3DELRR) DEF Program	C/CS	TBD - Competitive EMD Contract Award : TBD	0.450	1.110		0.803		-		-		-	Continuing	Continuing	-
Small Diameter Bomb II (SDB II) DEF Program	SS/CS	Raytheon Missile Systems : Tuscon, AZ	0.000	0.660		0.654		1.000		-		1.000	Continuing	Continuing	-
P-8A DEF Program	SS/CS	Boeing Company : Seattle, WA	0.000	0.231		-		-		-		-	-	0.231	-
Army Integrated Air and Missile Defense (AIAMD) DEF Program	SS/CS	Northrop Grumman : Huntsville, AL	0.650	-		0.567		-		-		-	Continuing	Continuing	-
Common Infrared Countermeasures (CIRCM) DEF Program	C/CS	TBD - Competitive EMD Contract Award : TBD	0.280	-		-		0.371		-		0.371	Continuing	Continuing	-
MQ-4C Triton (formerly BAMS) DEF Program	SS/CS	Northrop Grumman : Bethpage, NY	0.800	-		-		0.400		-		0.400	Continuing	Continuing	-
Subtotal			3.086	3.243		2.938		2.973		-		2.973	-	-	-

Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DEF Contract Support	C/FFP	LMI : McLean, VA	0.334	0.250		0.250		0.250		-		0.250	-	1.084	-
DEF Contract Support - AAAS	MIPR	Oak Ridge Institute : AL	0.050	0.097		-		-		-		-	-	0.147	-
Subtotal			0.384	0.347		0.250		0.250		-		0.250	-	1.231	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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DEF Project Plan

		10/1/2014	10/2/2015	10/1/2016	10/1/2017	10/1/2018	10/2/2019	10/1/2020	10/1/2021	10/1/2022
FY15 Project Execution										
FY16 Project Execution										
FY17 Project Execution										
FY18 Project Execution										
FY19 Project Execution										
FY20 Project Execution										
FY21 Project Execution										
FY22 Project Execution										

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605022D8Z / <i>Defense Exportability Program</i>	Project (Number/Name) P013 / <i>Defense Exportability Features (DEF) Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 DEF Studies	1	2014	1	2016
FY15 DEF Studies	1	2015	1	2017
FY16 DEF Studies	1	2016	1	2018
FY17 DEF Studies	1	2017	1	2019
FY18 DEF Studies	1	2018	1	2020
FY19 DEF Studies	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)					PE 0605027D8Z I OUSD(C) IT Development Initiative							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	20.768	6.599	6.500	5.962	-	5.962	2.972	-	-	-	-	-
927: Next Generation Resource Management System	20.768	6.599	6.500	5.962	-	5.962	2.972	-	-	-	-	-

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	6.788	6.500	6.000	-	6.000
Current President's Budget	6.599	6.500	5.962	-	5.962
Total Adjustments	-0.189	-	-0.038	-	-0.038
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-0.003	-	-	-	-
• SBIR/STTR Transfer	-0.186	-	-	-	-
• Department Realignment	-	-	-0.023	-	-0.023
• Economic Assumptions	-	-	-0.015	-	-0.015

Change Summary Explanation

FY2014 changes: SBR/STTR transfers (-\$0.186M), Reserves (-\$0.003M).

FY2016 changes: Department realignment (-\$0.023M) and adjustment for Economic Assumptions (-\$0.015M).

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
927: Next Generation Resource Management System	20.768	6.599	6.500	5.962	-	5.962	2.972	-	-	-	-	-
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 2014	FY 2015	FY 2016
Title: Next Generation Resource Management System	6.599	6.500	5.962

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments: Continued Program Management Office 1Q FY 2014 - 4Q FY 2014. Milestone A 1Q FY 2014 RFP Release 1Q FY 2014. Solicitation Phase 1Q FY 2014 Evaluation Phase 1Q FY 2014 - 2Q FY 2014 Contract Award 4Q FY 2014 Post Award Activities 4Q FY 2014</p> <p>FY 2015 Plans: Continue Program Management Office 1Q FY 2015 - 4Q FY 2015. MSB 1Q FY 2015 Increment 1.0 Development, review and acceptance 1Q FY 2015 - 1Q FY 2016</p> <p>FY 2016 Plans: Continue Program Management Office 1Q FY 2016 - 4Q FY 2016. Increment 2.0 development, review and acceptance 1Q FY 2016 - 4Q FY 2016</p>			
Accomplishments/Planned Programs Subtotals	6.599	6.500	5.962

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
Analysis of the Alternatives (AoA) Revisions 1Q FY 2013
MDD 2Q FY 2013
Business Process Reengineering 4Q FY 2013
Conduct Market Investigation 2Q FY 2013

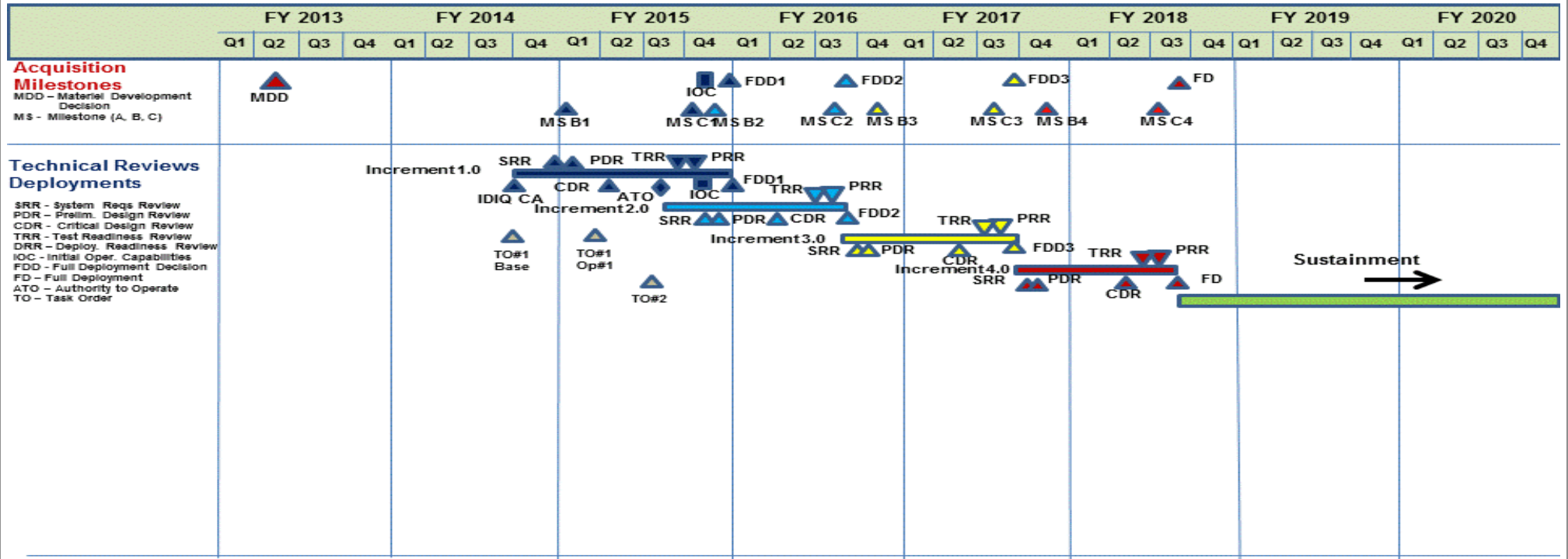
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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605027D8Z / OUSD(C) IT <i>Development Initiative</i>	Project (Number/Name) 927 / Next Generation Resource <i>Management System</i>
Finalize market investigation 2Q FY 2013 MSA 1Q FY 2014 RFP Release 1Q FY 2014 Contract Award 4Q FY 2014 MSB 1Q FY 2015 Increment 1.0 development and acceptance 1Q FY 2015 - 1Q FY 2016 Increment 2.0 development and acceptance 3Q FY 2016 - 3Q FY 2017 Increment 3.0 development and acceptance 3Q FY 2017 - 3Q FY 2018 Once infrastructure is in place, competitive contracts will be awarded in the out years for individual services/applications.		
E. Performance Metrics N/A		

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

NGRMS Schedule Increment Implementation Schedule



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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605027D8Z / OUSD(C) IT <i>Development Initiative</i>	Project (Number/Name) 927 / Next Generation Resource <i>Management System</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Acquisition Milestones B1, B2, C1 - Increment 1.0	4	2014	4	2015
Acquisition Milestones C1, C2, B2, B3 - Increment 2.0	3	2015	3	2016
Acquisition Milestones B3, C3 - Increment 3.0	4	2016	4	2017
Acquisition Milestones B4, C4 - Increment 4.0	4	2017	3	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605075D8Z I DCMO Policy and Integration
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	50.023	19.318	19.324	2.223	-	2.223	1.986	1.644	1.339	1.648	Continuing	Continuing
075: <i>DCMO Policy and Integration</i>	50.023	19.318	19.324	2.223	-	2.223	1.986	1.644	1.339	1.648	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	19.969	19.351	16.227	-	16.227
Current President's Budget	19.318	19.324	2.223	-	2.223
Total Adjustments	-0.651	-0.027	-14.004	-	-14.004
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.651	-			
• FFRDC Reduction	-	-0.027	-	-	-
• Adjustments due to mission change, inflation and to support other department priorities.	-	-	-14.004	-	-14.004

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
075: DCMO Policy and Integration	50.023	19.318	19.324	2.223	-	2.223	1.986	1.644	1.339	1.648	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 2014	FY 2015	FY 2016
Title: DCMO Policy and Integration	19.318	19.324	2.223
<p>FY 2014 Accomplishments: BEA Compliance, Standards, and DCMO Tools Implementations</p> <ul style="list-style-type: none"> • Designed, developed and deployed a restructured BEA application and information resource capability that provides more efficient and effective execution of DCMO Section 2222 of Title 10, U.S.C. responsibilities for the Defense BEA. • Designed, developed, and delivered DoD enterprise wide Business Intelligence and Analytics (BIA) visualizations and examinations throughout the Investment Review Board, Enterprise Transition Plan, and Out of Cycle review seasons. • Designed, developed, and delivered SharePoint solutions to support the DoD Business Mission Area (BMA), Office of the DCMO, Planning and Performance Management, and government responsibilities for DoD Conference Reporting. • Enabled innovation through utilization of technology to support more and better alignment of business operations for the Department. Innovations incorporated a strategic alignment of BEA views of operational activities to include the capture of resources, processes and enabling technologies. • Further developed and implemented the BEA technology strategy to improve the articulation of business requirements and performance metrics and strengthen outreach to DoD and Federal business stakeholders, decision makers and civilian and commercial business leaders. • Collaborated with DoD CIO regarding interoperability and data requirements and Joint Information Environment (JIE) alignment, implementation and compliance methods and information sharing standards for the BMA. Provided input on progress of business system milestones and documented status in the Congressional Report on Defense Business Operations. • Encouraged the evolution of architecture and data standards in support of DoD requirements and processes for implementing open standards and enterprise level applications. • Initiated actions to transition BIA hosting environment to the Defense Information Systems Agency. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Collaborated with the Federal CTO and Federal CIO in support of Federal Reporting and Performance Initiatives. • Supported IT Business Acquisition Oversight by providing technical standards and real time BEA compliance reporting and analytical support to IRBs. • Designed, developed and deployed tools for management of business system problem statements, support to Combatant Commanders (COCOMS) in support of their business systems, pilots to support process and policy change in the business mission area and oversight tools for DCMO. <p>FY 2015 Plans: BEA Compliance, Standards, and DCMO Tools Implementations</p> <ul style="list-style-type: none"> • 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 business process system reviews. • Incorporate 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. • Address revised design and deployment requirements to support BEA restructuring supporting OSD organization actions and reviews. This includes structure improvements for Business Case Analysis (BCA) and Service Development and Delivery Process (SDDP) artifacts. • Further design, develop, and deploy DoD enterprise wide visualization and analysis capabilities for organizational Business Process System Reviews (BPSRs) as well as overall DoD mission area system oversight analysis. • Continue 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. • Continue data integration for automated processing of authoritative data source information and staging of content in a shared web-service cloud environment. • Further develop and implement the BEA technology strategy to improve the articulation of document business requirements and performance metrics, strengthening outreach to DoD and Federal business stakeholders, decision makers and civilian and commercial business leaders. • Continue evolution of open architecture and data standards in support of DoD requirements and processes for enabling and implementing enterprise level business applications. • Enable deployment of Defense Business system (DBS) capabilities consistent with evolving BEA direction and guidance. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • 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. 			
Accomplishments/Planned Programs Subtotals	19.318	19.324	2.223

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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605075D8Z / <i>DCMO Policy and Integration</i>	Project (Number/Name) 075 / <i>DCMO Policy and Integration</i>

business outcomes are then incorporated into the architecture data products making up the Department's Business Enterprise Architecture (BEA), under the oversight and direction of the Defense Business Council. This metric measures the incorporation of the Component identified business outcomes into the BEA. FY 2014 Goal: 80% of business outcomes and BRM/PRM performance data incorporated into the BEA. FY 2015 Goal: 90% of business outcomes and BRM/PRM performance data incorporated into the BEA. FY 2016 Goal: 100% of business outcomes and BRM/PRM performance data incorporated into the BEA.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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: 5 Jan 2015							
Appropriation/Budget Activity:					Program Element Number and Name:					Project Number and Name:										
Fiscal Year	FY 2014				FY 2015				FY 2016				FY 2017							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
BEA Compliance, Standards, and DCMO Capability Implementations	▲1																▲1			
							▲2	▲2	▲2	▲2	▲2	▲2								
							▲3	▲3	▲3	▲3	▲3	▲3								
								▲4	▲4		▲4									

- BEA Compliance, Standards, and DCMO Capability Implementations**
1. Design enterprise architecture taxonomy to support DCMO Title 10 Section 2222 responsibilities for Defense Business Enterprise Architecture. After initial design, the capability will continue to support BEA collection.
 2. Design and deliver capabilities to automatically generate metadata on ingest of enterprise architectural information. Development will be iterative until fully proven out, and functionality will remain.
 3. Design and develop user access to the Business Enterprise Architecture via web services. Development will be iterative and functionality will remain.
 4. Port the BEA into a cloud environment, including testing capability in advance of complete operational usage.

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Sub projects				
Design enterprise architecture taxonomy	1	2014	2	2016
Capability to automatically generate metadata on ingest of architecture information	3	2015	4	2016
User access to BEA via web services	2	2015	4	2016
Port BEA to a cloud environment	3	2015	2	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605210D8Z I <i>Defense-Wide Electronic Procurement Capabilities</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	36.341	5.659	9.546	7.209	-	7.209	11.562	11.141	9.890	10.024	Continuing	Continuing
P*021: <i>Defense-Wide Electronic Procurement Capabilities-Contingency</i>	36.341	5.659	9.546	7.209	-	7.209	11.562	11.141	9.890	10.024	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$5.000 million to account for the availability of prior year execution balances.

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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	6.184	9.546	9.459	-	9.459
Current President's Budget	5.659	9.546	7.209	-	7.209
Total Adjustments	-0.525	-	-2.250	-	-2.250
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.525	-			
• FY 2016 Program Increase	-	-	2.800	-	2.800
• FY 2016 Baseline Reduction	-	-	-5.037	-	-5.037
• Economic Assumptions Reduction	-	-	-0.013	-	-0.013

Change Summary Explanation

The FY 2016 funding request was reduced by \$5.000 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P*021: Defense-Wide Electronic Procurement Capabilities- Contingency	36.341	5.659	9.546	7.209	-	7.209	11.562	11.141	9.890	10.024	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)

Title: Defense-Wide Electronic Procurement Capabilities- Contingency	FY 2014	FY 2015	FY 2016
	5.659	9.546	7.209
FY 2014 Accomplishments: Continued funding will be used to continue development of an end to end paperless reconciliation process for Government Furnished Property (GFP); continued development of a data standard for warranty information; ensure that contract systems are modified to send data to personnel and readiness systems to account for logical and physical access to DoD systems; and to implement a fraud and misuse data mining detection capability for purchase cards in DoD. These funds will also be used to develop an initial end to end purchase request data standard process (including intergovernmental transactions). Additionally, these funds will support development of contingency contracting and financial management business tools for the warfighter that are currently in an immature development stage, or do not exist and to implement initiatives/tools in theater. PB14 adjustments/reductions to include SBIR/STTR were taken in the amount of .525M from the original President's Budget.			
FY 2015 Plans: 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			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605210D8Z / <i>Defense-Wide Electronic Procurement Capabilities</i>	Project (Number/Name) P*021 / <i>Defense-Wide Electronic Procurement Capabilities- Contingency</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>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 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.</p>			
Accomplishments/Planned Programs Subtotals	5.659	9.546	7.209

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

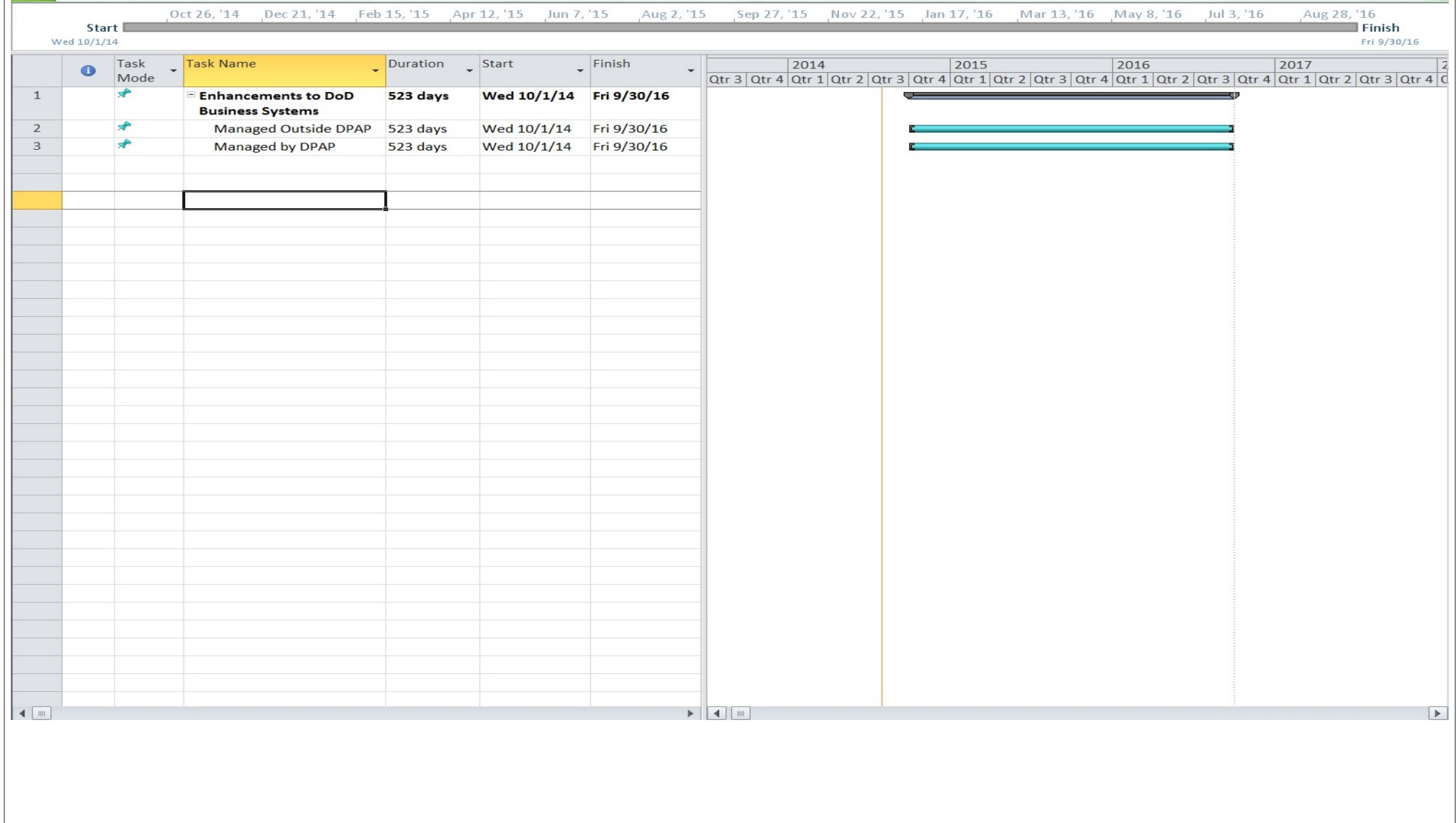
D. Acquisition Strategy
N/A

E. Performance Metrics
NA

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605210D8Z / <i>Defense-Wide Electronic Procurement Capabilities</i>	Project (Number/Name) P*021 / <i>Defense-Wide Electronic Procurement Capabilities- Contingency</i>
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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0605210D8Z / <i>Defense-Wide Electronic Procurement Capabilities</i>	Project (Number/Name) P*021 / <i>Defense-Wide Electronic Procurement Capabilities- Contingency</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>N/A</i>				
Enhancements Managed outside of DPAP	1	2014	4	2016
<i>Not Applicable</i>				
Enhancements Managed by DPAP	1	2014	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 5: System Development & Demonstration (SDD)	R-1 Program Element (Number/Name) PE 0305304D8Z I DoD Enterprise Energy Information Management (EEIM)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	3.176	3.482	3.660	4.414	-	4.414	4.545	4.704	4.973	5.028	Continuing	Continuing
304: Enterprise Energy Information Management	1.641	1.956	1.955	2.940	-	2.940	2.923	2.916	2.912	2.911	Continuing	Continuing
305: Real Property Accountability	1.535	1.526	1.705	1.474	-	1.474	1.622	1.788	2.061	2.117	Continuing	Continuing

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 are now assessing and planning which information management technologies (future and current) will best support them. Funding is required to keep this project on track and ensure that the DoD-wide energy management data environment becomes a reality.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	3.302	3.660	3.510	-	3.510
Current President's Budget	3.482	3.660	4.414	-	4.414
Total Adjustments	0.180	-	0.904	-	0.904
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	0.180	-			
• Total Adjustments	-	-	0.904	-	0.904

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
304: Enterprise Energy Information Management	1.641	1.956	1.955	2.940	-	2.940	2.923	2.916	2.912	2.911	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 are now assessing and planning which information management technologies (future and current) will best support them. 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 2014	FY 2015	FY 2016
Title: Enterprise Energy Information Management	1.956	1.955	2.940
FY 2014 Accomplishments: Funds supported the continued development and procurement of an enterprise-wide energy data warehouse that will be integrated with existing and future real property systems.			
FY 2015 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 2016 Plans: TBD			
Accomplishments/Planned Programs Subtotals	1.956	1.955	2.940

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / <i>DoD Enterprise Energy Information Management (EEIM)</i>	Project (Number/Name) 304 / <i>Enterprise Energy Information Management</i>

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
EEIM - In Porgress Reviews																												
FY 2014 in Progress Reviews	█																											
FY 2015 in Progress Reviews					█																							
FY 2016 in Progress Reviews								█																				
EEIM - Develop Program																												
Develop FY 2015 Program	█																											
Develop FY 2016 Program								█																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Schedule Details

Events by Sub Project	Start		End	
	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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
305: Real Property Accountability	1.535	1.526	1.705	1.474	-	1.474	1.622	1.788	2.061	2.117	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 2014	FY 2015	FY 2016
Title: Real Property Accountability	1.526	1.705	1.474
FY 2014 Accomplishments: This funding was used to continue 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.			
FY 2015 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.			
FY 2016 Plans: TBD			
Accomplishments/Planned Programs Subtotals	1.526	1.705	1.474

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 5	R-1 Program Element (Number/Name) PE 0305304D8Z / <i>DoD Enterprise Energy Information Management (EEIM)</i>	Project (Number/Name) 305 / <i>Real Property Accountability</i>

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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

Real Property Accountability - In Progress Reviews

FY 2014 in Progress Reviews	████████		
FY 2015 in Progress Reviews		████████	
FY 2016 in Progress Reviews			████████

Real Property Accountability - Develop Program

Develop FY 2015 Program	████████		
Develop FY 2016 Program		████████	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Real Property Accountability - In Progress Reviews</i>				
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
<i>Real Property Accountability - Develop Program</i>				
Develop FY 2015 Program	1	2014	4	2014
Develop FY 2016 Program	1	2015	4	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604774D8Z I <i>Defense Readiness Reporting System (DRRS)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	12.413	6.353	5.607	5.581	-	5.581	5.709	6.027	6.404	6.581	Continuing	Continuing
<i>774: Defense Readiness Reporting System (DRRS)</i>	12.413	6.353	5.607	5.581	-	5.581	5.709	6.027	6.404	6.581	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 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604774D8Z / <i>Defense Readiness Reporting System (DRRS)</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	6.356	5.616	5.619	-	5.619
Current President's Budget	6.353	5.607	5.581	-	5.581
Total Adjustments	-0.003	-0.009	-0.038	-	-0.038
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.003	-			
• SBIR/STTR Transfer	-	-			
• Baseline Program Adjustment	-	-	-0.038	-	-0.038
• FFRDC (Section 8104)	-	-0.009	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
774: Defense Readiness Reporting System (DRRS)	12.413	6.353	5.607	5.581	-	5.581	5.709	6.027	6.404	6.581	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 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: 774 Defense Readiness Reporting System	6.353	5.607	5.581

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604774D8Z / <i>Defense Readiness Reporting System (DRRS)</i>	Project (Number/Name) 774 / <i>Defense Readiness Reporting System (DRRS)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Achieved Full Operational Capability (FOC) • Continued Software lifecycle support • Continued to assist the Services using DRRS to support their Component Commanders and the COCOMS • Continued refinement of data architecture and integration of GFM DI within DRRS • Data quality improvement • Data latency improvement with the use of Dashboards • Implemented PKI authentication within the DRRS application • Continued implementing functionality to facilitate the retirement of legacy systems and automate portions of the Air Force reporting process. • Continued necessary system testing by outside agencies <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604774D8Z / <i>Defense Readiness Reporting System (DRRS)</i>	Project (Number/Name) 774 / <i>Defense Readiness Reporting System (DRRS)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Complete Joint Interoperability testing through the Joint Interoperability Test Command (JITC) <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> • 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) 			
Accomplishments/Planned Programs Subtotals	6.353	5.607	5.581

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604875D8Z I <i>Joint Systems Architecture Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	7.772	2.389	3.087	3.081	-	3.081	4.634	5.121	5.488	5.563	Continuing	Continuing
P876: <i>Portfolio Systems Acquisition (PSA)</i>	7.772	2.389	3.087	3.081	-	3.081	4.634	5.121	5.488	5.563	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$0.600 million to account for the availability of prior year execution balances.

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).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604875D8Z I <i>Joint Systems Architecture Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	2.471	3.092	3.704	-	3.704
Current President's Budget	2.389	3.087	3.081	-	3.081
Total Adjustments	-0.082	-0.005	-0.623	-	-0.623
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.011	-			
• SBIR/STTR Transfer	-0.071	-			
• FY 2016 Baseline Adjustment	-	-	-0.609	-	-0.609
• Economic Assumptions	-	-	-0.014	-	-0.014
• FFRDC	-	-0.005	-	-	-

Change Summary Explanation

Program baseline realigned by the department for other priorities.

NOTE: The FY 2016 funding request was reduced by \$0.600 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0604875D8Z / <i>Joint Systems Architecture Development</i>				Project (Number/Name) P876 / <i>Portfolio Systems Acquisition (PSA)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P876: <i>Portfolio Systems Acquisition (PSA)</i>	7.772	2.389	3.087	3.081	-	3.081	4.634	5.121	5.488	5.563	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. 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 to achieve portfolio systems acquisition goals and to develop and implement acquisition reform initiatives. The program is broken up into two focus areas (Portfolio Management and Reform Initiatives) and consolidates work previously performed under various other Program Elements.

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Portfolio Systems Acquisition Initiatives	FY 2014	FY 2015	FY 2016
	2.389	3.087	3.081
FY 2014 Accomplishments:			
-Supported Mission Area Portfolio Assessments and warfare areas to identify portfolio and program synergies, reduce duplication, and identify opportunities for cost savings.			
-Conducted analyses and support implementation of Better Buying Power initiatives.			
-Provided technical expertise in support of warfare area portfolios.			
-Assessed progress of program management initiatives and supported to a variety of certification and qualification standards activities.			
-Continued "reliability by design" analyses and support to programs.			
-Developed DoD courses of action and views on homeland defense implementation and compliance issues in multiple bilateral and multilateral fora.			
-Provided analytical support to the Homeland Defense Coordinator function within OUSD(AT&L).			
-Updated roadmaps to guide investments in critical areas (e.g., future vertical lift and Integrated Air And Missile Defense (IAMD)).			
-Continued analytical support for the IAMD portfolio.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604875D8Z / <i>Joint Systems Architecture Development</i>	Project (Number/Name) P876 / <i>Portfolio Systems Acquisition (PSA)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>-Initiated the first of an expected series of review of Electronic Warfare related technologies as they apply to current and future weapon systems. First study area was Millimeter Wave (MMW).</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> -Continue to 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 Better Buying Power 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 to guide investments in critical areas (e.g., future vertical lift and IAMD). -Continue analytical support for the IAMD portfolio. -Complete the MMW study and fold results into the FY2016 President's Budget Review. Initiate another EW-related review. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> -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 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 and IAMD). -Continue analytical support for the IAMD portfolio. 			
Accomplishments/Planned Programs Subtotals	2.389	3.087	3.081

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604940D8Z I <i>Central Test and Evaluation Investment Program (CTEIP)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	333.769	175.908	239.163	229.125	-	229.125	213.559	176.948	175.627	178.000	Continuing	Continuing
940: <i>Central Test and Evaluation Investment Program (CTEIP)</i>	333.769	175.908	239.163	229.125	-	229.125	213.559	176.948	175.627	178.000	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, miniaturized flight safety systems, realistic urban test environments, ground testing for hypersonic systems and satellites, 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),

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604940D8Z / <i>Central Test and Evaluation Investment Program (CTEIP)</i>
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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 Research Category 6.4 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	179.607	254.503	245.197	-	245.197
Current President's Budget	175.908	239.163	229.125	-	229.125
Total Adjustments	-3.699	-15.340	-16.072	-	-16.072
• Congressional General Reductions	-	-0.340			
• Congressional Directed Reductions	-	-15.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.623	-			
• Internal Adjustments	-0.076	-	3.928	-	3.928
• Baseline Reduced for Department Priorities	-	-	-20.000	-	-20.000

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.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Title: Central Test and Evaluation Investment Program	175.908	239.163	229.125
FY 2014 Accomplishments:			
JIM Projects:			
- Completed system development for the Next Generation Electronic Warfare Environment Generator Build A project to provide a multiple jammer beam characterization system for dynamic stimulation and measurement of multiple jamming and radar signals.			
- Completed system development of the Multi-Spectral Sea and Land Target Simulator project to provide a portable open-air plume simulator to test infrared (IR) and ultraviolet (UV) missile warning and countermeasures systems against land- and sea-based threats.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I</i> BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604940D8Z <i>I Central Test and Evaluation Investment Program (CTEIP)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 concept development and preliminary design and initiated system development for the Joint Urban Test Capability to provide urban environment test capabilities. - Completed requirements development and planning and initiated 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 requirements development and planning and initiated 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. - Continued 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. - Continued concept development and preliminary design 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 concept development and preliminary design and initiated systems development for 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 concept development and preliminary design and initiated systems development 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 system development for the Objective Helicopter Icing Spray System project to provide an enhanced capability to perform in-flight icing and rain testing for low-speed air vehicles. - Continued system development for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - 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 requirements development and planning and initiated concept development and preliminary design the Synthetic Battlefield Emitter Systems project to provide a controlled density open air environment for testing of C4ISR systems. - 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 the Electronic Warfare Test Resource Enhancement Project to develop improved electronic warfare test capabilities for fielding at Installed Systems Test Facilities, threat simulation facilities, and open air test ranges to address critical shortfalls in developmental and operational testing of F-35 and other high performance aircraft against advanced threats. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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- Continued the Test and Training Enabling Architecture Software Development Activity to promote integrated testing and simulation-based acquisition through the use of a logical range consisting of distributed live, virtual, and constructive elements tied together by a common architecture.
- Completed requirements development and planning and initiated concept development and preliminary design 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.
- Initiated Mid-Pressure Arc Heater prototype effort to support development of hypersonic ground test facilities for future high-speed systems.
- Initiated requirements development and planning 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.
- Initiated requirements development and planning for 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.
- Initiated requirements development and planning 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.
- Initiated 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.
- Initiated 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.
- 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:

- Continued development of Hostile Fire Indicator Site (HFIS) to enhance existing Hostile Fire Indicator test site with key upgrades to fully facilitate HFI testing of warning systems.
- Continued development of Mobile Flight Mission Simulator (mFMS) Advanced Electronic Attack (AEA) to provide realistic electronic attack capabilities into PATRIOT Flight Mission Simulators.
- Completed delivery of the J-31 Radar Missile Gun System project.
- Continued 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).
- Continued development of Torpedo Operational Testing Using Modeling and Simulation (TOTUMS) to enhance torpedo OT&E by upgrading an high interest target list (HITL) simulator and environment simulator for high-fidelity, OT-ready realism.

	FY 2014	FY 2015	FY 2016

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continued development of C2 and Urban Background Environment Simulator (CUBES) to incorporate modern signal processor advances 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 government-furnished equipment (GFE) booster to blue "Zombie" maneuvering target. - 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 Joint Allied Threat Awareness System. - Continued the Automated Test Case Generator Web Service (ATC-GEN WS) to provide 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. - Initiated the DIADS Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced electronic countermeasures (ECM) response features in support of Joint Strike Fighter (JSF) and F-22 operational testing. - Initiated the Wideband Configurable Control Jammer (WCCJ) Enhancement to develop and integrate an Electronic Support Measures (ESM) subsystem into WCCJ, thus improving its ability to monitor and prioritize signals during Network Integrated Exercise events. <p>FY 2015 Plans: JIM Projects:</p> <ul style="list-style-type: none"> - Continue 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. - Complete concept development and preliminary design and initiate 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. - Complete 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. - 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 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 systems development for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - Continue concept development and preliminary design for the Joint Urban Test Capability to provide urban environment test capabilities. 			

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C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Complete concept development and preliminary design and initiate 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 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. - 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. - Complete concept development and preliminary design and initiate system development for the Synthetic Battlefield Emitter Systems project to provide a controlled density open air environment for testing of C4ISR systems. - Complete concept development and preliminary design and initiate 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 the Electronic Warfare Test Resource Enhancement Project to develop improved electronic warfare test capabilities for fielding at Installed Systems Test Facilities, threat simulation facilities, and open air test ranges to address critical shortfalls in developmental and operational testing of F-35 and other high performance aircraft against advanced threats. - Continue the Test and Training Enabling Architecture Software Development Activity to promote integrated testing and simulation-based acquisition through the use of a logical range consisting of distributed live, virtual, and constructive elements tied together by a common architecture. - Continue 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. - Initiate 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. - Continue risk reduction activities under the Enhanced Solutions Process for potential multi-service T&E developments, as recommended by Service Test and Evaluation Executives. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Resource Enhancement Project:</p> <ul style="list-style-type: none"> - Complete development of Hostile Fire Indicator Site (HFIS) to enhance existing Hostile Fire Indicator test site with key upgrades to fully facilitate HFI testing of warning systems. - Complete development of C2 and Urban Background Environment Simulator (CUBES) to incorporate modern signal processor advances for Installed System Test Facility communications jamming purposes. - Continue development of Boosted Zombie Target (BZT) to develop multi-stage, economical targets for PAC-3 by integrating a GFE booster to blue "Zombie" maneuvering target. - Continue the DIADS Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced ECM response features in support of JSF and F-22 operational testing. - Complete the Wideband Configurable Control Jammer (WCCJ) Enhancement to develop and integrate an Electronic Support Measures (ESM) subsystem into WCCJ, thus improving its ability to monitor and prioritize signals during Network Integrated Exercise events. - 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 Advance Threat Warning (ATW) system. - Complete the Automated Test Case Generator Web Service (ATC-GEN WS) to provide 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. - Continue 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 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). - Initiate development of MSALTS Ultraviolet Emitter Enhancement (MUVEE) - Upgrades to Multi Spectral Sea and Land Target Simulator (MSALTS) with LED-based UV source for short shot hostile fire IRCM end-to-end threat engagements. - Initiate development of Submarine Launched Modular 3-inch Device (SLAM-3D)- Cluster Donut countermeasure emulator that will help resolve the Anti-Submarine Warfare COI for the Mk 54 Mod 1 Torpedo. - Initiate development of Airborne Early Warning Interoperability Simulator (AEIS)- Develops 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. <p>FY 2016 Plans:</p> <p>JIM Projects:</p> <ul style="list-style-type: none"> - 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. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 for the Common Range Integrated Instrumentation System project to develop a common range instrumentation system to address next generation range data requirements. - Continue concept development and preliminary design and initiate system development for the Joint Urban Test Capability to provide urban environment test capabilities. - 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 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. - 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 the Electronic Warfare Test Resource Enhancement Project to develop improved electronic warfare test capabilities for fielding at Installed Systems Test Facilities, threat simulation facilities, and open air test ranges to address critical shortfalls in developmental and operational testing of F-35 and other high performance aircraft against advanced threats. - Initiate system 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. - 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. - Continue the Test and Training Enabling Architecture Software Development Activity to promote integrated testing and simulation-based acquisition through the use of a logical range consisting of distributed live, virtual, and constructive elements tied together by a common architecture. 			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continue 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. - Initiate requirements development and planning for new multi-service T&E developments endorsed by the DoD T&E Executive Agent. - Continue risk reduction activities under the Enhanced Solutions Process for potential multi-service T&E developments, as recommended by Service Test and Evaluation Executives. <p>Resource Enhancement Project:</p> <ul style="list-style-type: none"> - 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 Boosted Zombie Target (BZT) to develop multi-stage, economical targets for PAC-3 by integrating a GFE booster to 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 Joint Allied Threat Awareness System. - Complete the Automated Test Case Generator Web Service (ATC-GEN WS) to provide 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 the DIADS Sensor Reactivity Upgrade (SRU) to upgrade DIADS radars with enhanced ECM response features in support of JSF and F-22 operational testing. - 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 ATW- Advance Threat Warning. - Continue development of MSALTS Ultraviolet Emitter Enhancement (MUVEE) - Upgrades to 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 development of Submarine Launched Modular 3-inch Device (SLAM-3D)- 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)- Develops 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. - Continue development of instrumented facilities to evaluate our next generation of sensors, weapons, platforms, and C4ISR systems in a realistic urban environment. 			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604940D8Z I <i>Central Test and Evaluation Investment Program (CTEIP)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continue development of hardware simulators to test missile warning systems of new generation electronic warfare (EW) suites in a dynamic environment. - Continue the development of non-intrusive instrumentation to address near term OT capability shortfalls to evaluate advanced sensor system performance in harsh environments. 			
Accomplishments/Planned Programs Subtotals	175.908	239.163	229.125

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604942D8Z / <i>Assessments & Evaluations</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	4.719	2.051	15.639	28.674	-	28.674	29.576	30.622	32.116	32.462	Continuing	Continuing
P805: <i>Assessments & Evaluations</i>	4.719	2.051	15.639	28.674	-	28.674	29.576	30.622	32.116	32.462	Continuing	Continuing

Note

Starting in FY2016 and beyond, the fee-for-service business structure was replaced with a fully organic funding structure which accounts for the increase in funding requested.

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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	2.115	21.661	22.341	-	22.341
Current President's Budget	2.051	15.639	28.674	-	28.674
Total Adjustments	-0.064	-6.022	6.333	-	6.333
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.064	-			
• Congressional Reduction due to program growth	-	-6.000	-	-	-
• Program change from fee-for-service to fully organically funded	-	-	6.333	-	6.333
• FFRDC	-	-0.022	-	-	-

Change Summary Explanation

NOTE: Program was changed from fee-for-service to fully organically funded in FY2016 and beyond which accounts for increased funding request.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604942D8Z / Assessments & Evaluations	Project (Number/Name) P805 / Assessments & Evaluations
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P805: Assessments & Evaluations	4.719	2.051	15.639	28.674	-	28.674	29.576	30.622	32.116	32.462	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Starting in FY 2016, the fee-for-service structure was changed to fully institutional funding which accounts for the increase in funding requested.

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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Assessments & Evaluations	2.051	15.639	28.674	-	28.674
Description: Classified Program					
FY 2014 Accomplishments: Information is Classified.					
FY 2015 Plans: 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 Base Plans: Program change from fee-for-service to fully organically funding drives the increase in funding requested. Detailed information is Classified.					
FY 2016 OCO Plans: Not applicable.					
Accomplishments/Planned Programs Subtotals	2.051	15.639	28.674	-	28.674

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0604942D8Z / <i>Assessments & Evaluations</i>	Project (Number/Name) P805 / <i>Assessments & Evaluations</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

This is a RDT&E Management and Support effort and does not acquire any products.

E. Performance Metrics

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0604943D8Z / <i>Thermal Vicar</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	15.096	8.099	-	-	-	-	-	-	-	-	Continuing	Continuing
P943: <i>Thermal Vicar</i>	15.096	8.099	-	-	-	-	-	-	-	-	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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	8.255	-	-	-	-
Current President's Budget	8.099	-	-	-	-
Total Adjustments	-0.156	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.156	-			

Change Summary Explanation

Starting in FY2015 and beyond, program content and funding from Program Element 0604943D8Z were moved to Program Element 0604942D8Z to effect efficiencies and streamline oversight of programmatic content.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)				Project (Number/Name)			
0400 / 6					PE 0604943D8Z / <i>Thermal Vicar</i>				P943 / <i>Thermal Vicar</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P943: <i>Thermal Vicar</i>	15.096	8.099	-	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: Thermal Vicar	8.099	-	-
Description: Information is Classified.			
FY 2014 Accomplishments: Information is Classified.			
Accomplishments/Planned Programs Subtotals	8.099	-	-

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support					R-1 Program Element (Number/Name) PE 0605100D8Z I Joint Mission Environment Test Capability (JMETC)							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	31.270	27.491	27.124	45.235	-	45.235	47.163	49.253	53.076	53.806	Continuing	Continuing
100: Joint Mission Environment Test Capability Distributed Test	31.270	17.491	16.843	25.583	-	25.583	26.751	28.305	31.139	31.376	Continuing	Continuing
200: Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment	0.000	10.000	10.281	19.652	-	19.652	20.412	20.948	21.937	22.430	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-14 the NCR demonstrated robust operational capability supporting 20 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 14-1, CyberGuard 14-1, 14-2 and 14-3 and just completed CyberFlag 15-1 in the 1QFY15. In 3QFY14 the NCR team executed the first Cybersecurity Developmental Test & Evaluation (DT&E) event supporting a Major Defense Acquisition Program (MDAP), the MQ-4C Triton Program. In the 1QFY-15 the NCR executed a second MDAP Cybersecurity DT&E Event in support of the P-8A Increment Three. In FY-15, a Systems of Systems Cybersecurity DT&E Event will be conducted involving triton, the P-8A and Tactical Mobile (TACMobile) Program. Additional events are planned in support of Cost Assessment and Program Evaluation (CAPE), F-35 (Re-programming Center West) Joint Space Operations Center (JSpOC) Mission Space (JMS) Program and other acquisition and operational customers. Concurrent with these NCR Events are engineering activities to sustain and upgrade NCR Computing Resources, improve the automated software tool suite and improve operational capabilities to satisfy increasing customer demand.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support	R-1 Program Element (Number/Name) PE 0605100D8Z I Joint Mission Environment Test Capability (JMETC)
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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.

B. Program Change Summary (\$ in Millions)	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	27.878	27.162	27.253	-	27.253
Current President's Budget	27.491	27.124	45.235	-	45.235
Total Adjustments	-0.387	-0.038	17.982	-	17.982
• Congressional General Reductions	-	-0.038			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.375	-			
• Internal Adjustments	-0.012	-	17.982	-	17.982

Change Summary Explanation

- Strategic efficiency reductions in management headquarters funding and staffing for better alignment and to provide support to a smaller military force.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
100: Joint Mission Environment Test Capability Distributed Test	31.270	17.491	16.843	25.583	-	25.583	26.751	28.305	31.139	31.376	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 2014	FY 2015	FY 2016
Title: Joint Mission Environment Test Capability Distributed Test	17.491	16.843	25.583
FY 2014 Accomplishments: - Provided the distributed test infrastructure for acquisition programs and projects testing to include F-35 Joint Strike Fighter interoperability tests, Apache Block III Link-16 Interoperability tests, Small Diameter Bomb II developmental tests, Advanced			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 100 / <i>Joint Mission Environment Test Capability Distributed Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Anti-Radiation Guided Missile operational testing, MQ-4C Triton developmental testing, Joint Integrated Air and Missile Defense Organization (JIAMDO) project testing, five Joint Interoperability Tests (JITS) for DISA's Joint Interoperability Test Command, Air Force Air Ground Integrated Layer Exploration (AGILE) Fire VIII, US Naval Air Systems Command (NAVAIR) Integrated Warfare Capability (IWC) test events, Naval Sea Systems Command (NAVSEA) Advanced Mid-Term Interoperability Improvement Program test events, Marine Corps Virtual Rapid Prototyping Laboratory (VRPL) experiments, five Air Force Interoperability Tests (AFSIT), and numerous smaller test activities, as well as continuous interconnectivity between distributed test resources for day-to-day exchange of test data.</p> <p>- Provided planning support for future distributed testing to other and on-going acquisition programs and projects including; F-35 Joint Strike Fighter, CVN-78, P-8A Poseidon, 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), Marine Corps Combat Operations Center (CoC), and Tactical Mobile(TacMobile), Army Network Integration Event (NIE)/Brigade Modernization, Counter Remote Controlled Improvised Explosive Device (IED) Electronic Warfare (CREW), Joint Tactical Networking Center (JTNC), Joint Reference Implementation Laboratory (JRIL).</p> <p>- Completed the Cyber T&E Roadmap draft and started the coordination and approval process. Began working with the newly chartered DoD Enterprise Cyber Range Environment Senior Steering Group to integrate capabilities across the four (4) Congressionally identified "Cyber Ranges" to support the communities of interest (COI) – testing, experimentation, training, and mission rehearsal – in an effective and efficient execution of cyber events.</p> <p>- Continued collaboration with the Training community by providing distributed test planning support to the Joint Staff J7, the Joint Staff J6 Command, Control, and Interoperability (C2I), and to other customers for their distributed test events.</p> <p>- Conducted strategic planning efforts to engage new acquisition programs that must demonstrate compliance with Net-Ready Key Performance Parameter (NR-KPP) and Cybersecurity requirements.</p> <p>- Continued coordination efforts to integrate DoD/Service/Industry/Academia distributed test and evaluation infrastructure to the JMETC infrastructure.</p> <p>- Continued the planning, alignment, and coordination to establish and improve the test infrastructure for cyber tests and assessments by leveraging activities across the Cyber communities. Identified several on-going efforts to improve capabilities in the areas of visualization and instrumentation.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 100 / <i>Joint Mission Environment Test Capability Distributed Test</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>- Enhanced the User Interface and content of the web-based JMETC Reuse Repository to store distributed test tools, utilities, lessons learned, and test metadata making all available to the DoD test community.</p> <p>- Assisted customers with the use of distributed test tools and troubleshooting of local network infrastructures. Provided remote and on-site support for the planning and execution of distributed events.</p> <p>- The Cyber Range Interoperability Standards (CRIS) initiative used the CRIS working group to develop a common lexicon and Cyber event planning and execution process. Identified the Test Specification Tool, modified to receive and output in other formats, as the first priority key areas in which investment would result in efficiencies and improved scalability on Cyber ranges across the community.</p> <p>- Initiated planning of distributed test infrastructure enhancements that will support multiple, concurrent classification up to and including TS//SCI with a focus on leveraging the Regional Service Delivery Point computing and storage capabilities and incorporating both conventional and cyber weapon systems to address growing interoperability and cyber T&E requirements. Supported pilot tests with three DoD programs.</p> <p>- Initiated RSDP #2 operations in June 2014, beginning support to the Littoral Combat Ship, and completed the build-up of the 2nd RSDP which will provide enterprise compute, storage, and common services resources. Identified Patuxent Naval Air Station as the site for RSDP 2 and conducted the site survey for installation.</p> <p>FY 2015 Plans:</p> <p>- Continue 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 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.</p> <p>- Continue 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).</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 100 / <i>Joint Mission Environment Test Capability Distributed Test</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 coordination efforts to integrate DoD/Service/Industry/Academia distributed test and evaluation infrastructure to the JMETC infrastructure. - 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., 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). - 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. - Begin implementation of distributed test infrastructure enhancements that will 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. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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, JIAMDOD 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 100 / <i>Joint Mission Environment Test Capability Distributed Test</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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, develop a central library for blue and red environments to promote reuse, begin development of in-line Type one encryption capability, and promote infrastructure for a quick-reaction cyber test capability. 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. 			
Accomplishments/Planned Programs Subtotals	17.491	16.843	25.583

<p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> <p>D. Acquisition Strategy N/A</p> <p>E. Performance Metrics</p> <ul style="list-style-type: none"> - Number of Distributed test sites - Number of events conducted - Number of acquisition programs supported

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
200: Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment	-	10.000	10.281	19.652	-	19.652	20.412	20.948	21.937	22.430	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 put under the Joint Mission Environment Test Capability (JMETC) management team. 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 ~50K high-fidelity virtual nodes. The NCR can operate in conjunction with other ranges through remote connectivity via 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 JMETC-funded National Cyber Range allows acquisition programs and operational forces to efficiently evaluate their cyber 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Joint Mission Environment Test Capability NCR Sustainment	10.000	10.281	19.652
FY 2014 Accomplishments:			
- Operated and sustained the National Cyber Range's (NCR) capabilities to meet growing customer requirements. In FY-14 the NCR demonstrated robust operational capability supporting 20 different events for a diverse set of customers including US Cyber Command, Joint Staff J-7, DOT&E and NAVAIR. The NCR was critical to the successful execution of CyberFlag 14-1,			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 200 / <i>Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>CyberGuard 14-1, 14-2 and 14-3. In 3QFY14 the NCR team executed the first Cybersecurity DT&E event supporting an MDAP Acquisition Program, the MQ-4C Triton Program. The NCR was utilized at 82% of available capacity for FY 2014. In the 4QFY14 and 1QFY15 the NCR was utilized at 98% of available capacity.</p> <ul style="list-style-type: none"> - Completed the NCR tools study to evaluate NCR tools for expansion for enterprise use. The NCR Test Specification Tool should be modified to receive input from multiple formats and sources and then output in a standard data format to make it usable on all Cyber Ranges. Near term focus was Interoperability with the RSDPs. - Completed plans to sustain the NCR Security Posture in accordance with the DIA Approved POA&M. Work will commence in 1QFY15 to be completed by the end of the quarter. - Implemented a wireless cyber test capability at the NCR which was used for a classified test customer. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Continue to Operate and sustain the National Cyber Range (NCR) capabilities to meet growing customer requirements. Support test planning and execution for acquisition programs such as TRITON, P-8A, USMC TacMobile, F-35, Littoral Combat Ship, and Joint Space Operations Center Mission Systems (JMS). 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). - Provide red and gray environments for Cyber Flag 15-1 and 15-2. Support one Cyber Knight event each month. Continue support to the DOT&E sponsored Enterprise Cyber Range Environment with one event per month. - Provide cyber T&E planning support to acquisition programs such as CVN 78, F-35 Joint Strike Fighter, and KC-46A Tanker to aid in building-in cyber security during early development. - Continue the high utilization for the NCR. - Continue to sustain the NCR capabilities and processes to support customer demand. Assess improvements needed in encryption, and increase capacity to support increased demand. Begin to modify the NCR's Test Specification Tool to make 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<p>it interoperable with other cyber ranges. Begin technical refreshment of the hardware in the existing NCR to further increase capacity.</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Continue to operate and sustain the National Cyber Range (NCR) capabilities to meet growing customer requirements. Support test planning and execution for acquisition programs such as TRITON, P-8A, TacMobile, Littoral Combat Ship, F-35 Joint Strike Fighter, and Joint Space Operations Center Mission Systems (JMS). Continue to support other DoD organizations providing cyber test capability to agencies such as Army Intelligence and Information Warfare Directorate, Office of Naval Intelligence, National Assessment Group, Director Operational Test and Evaluation, Army CERDEC, Navy SPAWAR, and Air Force 46th Test Squadron. - Continue to provide blue, red, and gray environments for Cyber Flag 16-1 and 16-2. Support one Cyber Knight event each month. Continue support to the DOT&E sponsored Enterprise Cyber Range Environment with one event per month. Support operational units such as the 780 MI Brigade, as called upon. - Continue to provide cyber T&E planning support to acquisition programs such as CVN 78 and KC-46A Tanker to aid in building-in cyber security during early development. - Continue to sustain the NCR capabilities and processes to support customer demand. Assess improvements needed in encryption, and increase capacity to support increased demand. Continue modification and development of the NCR's Test Specification Tool to make it interoperable with the RSDPs and other cyber ranges. Continue technical refreshment of the hardware in the existing NCR to further increase capacity. - Begin acquisition of additional NCR capacity to satisfy steadily increasing demands for cyber test and training capabilities. This effort would replicate the current NCR capacity and, through acquisition of more advanced hardware, significantly exceed current capacity. 			
Accomplishments/Planned Programs Subtotals	10.000	10.281	19.652

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605100D8Z / <i>Joint Mission Environment Test Capability (JMETC)</i>	Project (Number/Name) 200 / <i>Joint Mission Environment Test Capability National Cyber Range (NCR) Sustainment</i>

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	63.952	21.200	24.466	24.936	-	24.936	25.863	25.574	25.062	25.398	Continuing	Continuing
P421: <i>Technical Studies</i>	63.952	21.200	24.466	24.936	-	24.936	25.863	25.574	25.062	25.398	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 strategically to improve and support policy development, decision making, management and administration of DoD programs and activities. Studies and analysis will examine current and alternative policies, plans, operations, strategies and budgets, providing essential means for managing and responding to the ever-changing 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 effects of operational analysis in force planning assessments. With the expanding complexities of security threats in the geopolitical environment, the need for objective analysis and forward looking planning for the mid and long-term is vital.

Budget estimates reflect transfer of the Global Theater Security Cooperation Management Information Systems (TSCMIS) program to the Defense Security Cooperation Agency beginning in FY 2014.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	21.930	24.501	25.104	-	25.104
Current President's Budget	21.200	24.466	24.936	-	24.936
Total Adjustments	-0.730	-0.035	-0.168	-	-0.168
• Congressional General Reductions	-	-0.035			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.720	-			
• Budget Adjustments	-	-	-0.168	-	-0.168
• Internal transfer	-0.010	-	-	-	-

Change Summary Explanation

In FY 2014 and beyond Global Theater Security Cooperation Management Information Systems was transferred to Defense Security Cooperation Agency.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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*

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P421: <i>Technical Studies</i>	63.952	21.200	24.466	24.936	-	24.936	25.863	25.574	25.062	25.398	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 strategically to improve and support policy development, decision making, management and administration of DoD programs and activities. Studies and analysis will examine current and alternative policies, plans, operations, strategies and budgets, providing essential means for managing and responding to the ever-changing 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 effects of operational analysis in force planning assessments. With the expanding complexities of security threats in the geopolitical environment, the need for objective analysis and forward looking planning for the mid and long-term is vital.

Budget estimates for FY 2014 and future years reflect transfer of the Global Theater Security Cooperation Management Information Systems (TSCMIS) program to the Defense Security Cooperation Agency.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Technical Studies and Analyses Support for the Office of the Secretary of Defense	21.200	24.466	24.936
FY 2014 Accomplishments:			
Technical Support for the USD(Acquisition, Technology & Logistics): Provided studies and analyses of:			
Personal protection equipment from weapons of mass destruction, space portfolio architectures, Allied technology and warfighting capability planning, strategic command and control recapitalization requirements, Arctic mission requirements, conventional munitions, network interoperability in the acquisition process, space and missile platforms industrial base capabilities assessments, cyber infrastructure planning, technical requirements for arms control treaty compliance, future technology requirements in defense manufacturing, foreign investment in the defense industry, improving the use of commercial technology from small manufacturers, impacts of regulations on industry, the shipbuilding supplier industrial base, the effect of service life extension on support costs, measuring system reliability, modeling supply chain performance in the acquisition process, maintenance technology investment planning, strategic basing requirements, DoD installation sustainability, DoD energy and logistic strategic planning, NATO investment planning, identifying acquisition program risk, support to Defense Science Board task forces (strategic surprise risks, energy systems for forward remote operating bases, cyber policy, and ballistic and cruise missile			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>defense), small business investment and acquisition strategy, the effectiveness of the Small Business Innovation Research (SBIR) program, and DoD contracting policies toward small businesses</p> <p>Technical Support for the Director, Cost Assessment and Program Evaluation: Provided studies and analyses regarding the following areas:</p> <p>Contingency operations planning, vertical lift mission capabilities, amphibious capabilities, force structure planning, active and reserve personnel force models, assessments in support of scenario analyses, cyber requirements, cost assessments of the industrial base, defense laboratory infrastructure, countering violent extremism, 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</p> <p>Technical Support for the USD(Policy): Provided studies, analyses, and activities in the following areas:</p> <p>Regional and strategic defense posture, campaign planning in scenario analyses, maintaining regional deterrence and counterproliferation, strengthening regional peacekeeping operations, NATO policy engagement, international defense trade relationships, allied crisis coordination planning, cyber consequence management, space strategic guidance planning and sensing capabilities, homeland defense and civil/reserve support requirements, border security and evolving threats, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers</p> <p>Technical Support for the USD(Personnel & Readiness): Provided studies and analyses in the following areas:</p> <p>Recruiting and retention issues, combat force mix skills requirements, civilian transition programs for the wounded and disabled, controlling healthcare and manpower costs, forecasting the impacts and the development of mitigation strategies for impacts of potential force drawdowns, reserve component readiness and sustainability, military compensation policy, cyber workforce planning, civilian workforce demographics and sustainability, improving outcomes in DoD education activities, civilian deployment requirements, and the most efficient and effective uses of the Total Force</p> <p>Technical Support for the USD(Intelligence): Provided studies and analyses of:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Maintaining space assurance, technology in intelligence collection, and improving allied surveillance interoperability</p> <p>Technical Support for the Joint Staff conducting joint research with OSD:</p> <p>Provided studies and analyses with OSD addressing logistical supportability of basing options, weapons of mass destruction consequence management planning, strategic support operations, force projection capabilities, standoff attack capabilities, joint command and control, empirical analyses of contingency operations, and joint maintenance capabilities</p> <p>FY 2015 Plans: Technical Support for the USD(Acquisition, Technology & Logistics): Studies and analyses of:</p> <p>Joint warfighting capability and technology planning, strategic and conventional platform mission assurance, weapons system reliability, autonomous systems, aviation sustainability, space and airborne portfolio architectures, countering strategic threats, industrial base capabilities assessments and maintaining 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, logistics supply chain and energy requirements, NATO policy planning, 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</p> <p>Technical Support for the Director, Cost Assessment and Program Evaluation: Studies and analyses regarding the following areas:</p> <p>Strategic tradeoffs and risk management, maintaining force readiness, personnel force models, assessments in support of scenario analyses, military health programs, 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</p> <p>Technical Support for the USD(Policy): Studies, analyses, and activities in the following areas:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Regional and strategic defense posture, maritime domain awareness, allied reserve strengths, international defense policy planning, deterrence and counterproliferation requirements, strategic effects of climate change, NATO requirements planning, technological advances affecting arms control agreements, space and cyber strategic guidance planning, humanitarian and pandemic crisis response capabilities, allied human rights assurance, energy strategies and national security, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers</p> <p>Technical Support for the USD(Personnel & Readiness): Studies and analyses in the following areas:</p> <p>Active and reserve recruiting and retention issues, compensation and legacy costs, incentives for critical positions, forecasting the impacts and the development of mitigation strategies for impacts of potential force drawdowns, education benefit efficiency, recovery care for wounded and disabled personnel, reserve component readiness and sustainability, military family issues, and total force cost analyses</p> <p>Technical Support for the USD(Intelligence): Studies and analyses of:</p> <p>Surveillance technologies and capabilities, risk management, and military intelligence capabilities</p> <p>Technical Support for the Joint Staff conducting joint research with OSD:</p> <p>Studies and analyses with OSD addressing mobility capabilities, infrastructure requirements, countering anti-access environments, force programming planning, and basing requirements</p> <p>FY 2016 Plans: Technical Support for the USD(Acquisition, Technology & Logistics): Studies and analyses of:</p> <p>Joint warfighting capability and technology planning, strategic and conventional system technology, 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 policy issues, small business investment and</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>acquisition strategy, the effectiveness of the Small Business Innovation Research (SBIR) program, and DoD contracting policies toward small businesses</p> <p>Technical Support for the Director, Cost Assessment and Program Evaluation: Studies and analyses regarding the following areas:</p> <p>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</p> <p>Technical Support for the USD(Policy): Studies, analyses, and activities in the following areas:</p> <p>Requirements regarding geopolitical posture and policy such as regional and strategic defense posture, international defense policy planning, deterrence and counterproliferation requirements, international defense trade and industrial relationships, NATO requirements planning, technological and external effects on strategic requirements, space and cyber strategic guidance planning, contingency operations, countering emerging terrorist development, and strategic-level simulations of areas of interest for legislative and executive branch decision-makers</p> <p>Technical Support for the USD(Personnel & Readiness): Studies and analyses in the following areas:</p> <p>Requirements regarding sustaining and planning for the force such as active and reserve recruiting and retention issues, compensation analyses, military personnel recovery care, reserve component readiness and sustainability, military family and educational issues, gender and equal opportunity, and strategies for managing the Total Force portfolio</p> <p>Technical Support for the USD(Intelligence): Studies and analyses of:</p> <p>Requirements regarding intelligence related resources and needs such as surveillance technologies and capabilities, risk management, and military intelligence capabilities</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605104D8Z / <i>Technical Studies Support and Analysis</i>	Project (Number/Name) P421 / <i>Technical Studies</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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, homeland defense, force programming planning, and basing requirements			
Accomplishments/Planned Programs Subtotals	21.200	24.466	24.936

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

FY 2016 BA: \$24.936 FY 2016 BA Assoc w/Metrics: \$24.936M Percent FY 2016 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 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, and the National Security 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 from legislative direction.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	210.520	46.911	46.781	-	-	-	-	-	-	-	Continuing	Continuing
411: Foreign Materiel Acquisition and Exploitation	210.520	46.911	46.781	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding transfers to Air Force beginning in FY 2016.

A. Mission Description and Budget Item Justification

This program managed 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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	48.911	-	-	-	-
Current President's Budget	46.911	46.781	-	-	-
Total Adjustments	-2.000	46.781	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	46.781			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-2.000	-			
• SBIR/STTR Transfer	-	-			

Change Summary Explanation

Funding transfers to Air Force beginning in FY 2016.

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Foreign Materiel Acquisition and Exploitation	46.911	46.781	-
FY 2014 Accomplishments: Mission Support (Details provided in Defense-Wide classified book).			
FY 2015 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605117D8Z / <i>Foreign Materiel Acquisition and Exploitation</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Mission Support (Details provided in Defense-Wide classified book).			
<i>FY 2016 Plans:</i> Funding transfers to Air Force beginning in FY 2016.			
Accomplishments/Planned Programs Subtotals	46.911	46.781	-

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	187.298	99.957	100.000	-	-	-	-	-	-	-	Continuing	Continuing
128: Classified Program	187.298	99.957	100.000	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Classified

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	100.000	-	-	-	-
Current President's Budget	99.957	100.000	-	-	-
Total Adjustments	-0.043	100.000	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	100.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Program Adjustments	-0.043	-	-	-	-

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 128: Classified Program

Congressional Add: Classified

	FY 2014	FY 2015
	99.957	100.000
Congressional Add Subtotals for Project: 128	99.957	100.000
Congressional Add Totals for all Projects	99.957	100.000

Change Summary Explanation

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I</i> BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605128D8Z / <i>Classified Program</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015
Congressional Add: Classified	99.957	100.000
FY 2014 Accomplishments: Classified Program		
FY 2015 Plans: Classified Program		
Congressional Adds Subtotals	99.957	100.000

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

None

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605130D8Z / <i>Foreign Comparative Testing</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	33.968	11.877	-	-	-	-	-	-	-	-	Continuing	Continuing
P130: <i>Foreign Comparative Testing</i>	33.968	11.877	-	-	-	-	-	-	-	-	Continuing	Continuing

Note

In FY 2015, Foreign Comparative Testing funding in Program Element (PE) 0605130D8Z was transferred to PE 0603133D8Z to emphasize Proof of Principle and Pre-Engineering and Manufacturing Development (Pre-EMD) prototypes and Budget Activity alignment.

A. Mission Description and Budget Item Justification

The Foreign Comparative Testing (FCT) program supports the warfighter by leveraging technologies and equipment from allied nations and coalition partners to satisfy U.S. defense requirements, thereby accelerating the U.S. acquisition process and lowering development costs. The FCTs enhance interoperability, facilitate international collaboration, expand opportunities for prototyping to increase competition in innovation and enable 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 (Deputy Assistant Secretary of Defense (DASD) Emerging Capability & Prototyping (EC&P)), Comparative Technology Office (CTO). The FCT projects are sponsored by the Department, Services and U. S. Special Operations Command (USSOCOM). Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements, a thorough market survey, and development of a viable acquisition strategy.

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	12.125	-	-	-	-
Current President's Budget	11.877	-	-	-	-
Total Adjustments	-0.248	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.006	-			
• SBIR/STTR Transfer	-0.242	-			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605130D8Z / <i>Foreign Comparative Testing</i>				Project (Number/Name) P130 / <i>Foreign Comparative Testing</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P130: <i>Foreign Comparative Testing</i>	33.968	11.877	-	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Foreign Comparative Testing (FCT) program supports the warfighter by leveraging advanced technologies and equipment from allied nations and coalition partners to satisfy U.S. defense requirements, thereby accelerating the U.S. acquisition process and lowering development costs. The FCTs enhance interoperability, facilitate international collaboration, expand opportunities for prototyping and enable 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 (DASD) Emerging Capability & Prototyping (EC&P), Comparative Technology Office (CTO). The FCT projects are sponsored by the Department, Services and U.S. Special Operations Command (USSOCOM). Evaluation processes for project selection include a detailed review to confirm the proposed item addresses valid requirements, a thorough market survey, and development of a viable acquisition strategy.

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 the qualified foreign item in the U.S. 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 end result often translates to the creation of jobs and contributions to local economies throughout the United States. To date, companies across 34 states benefited from FCT projects.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Army Low Cost Innovative Projects (Projects Less Than One Million Dollars Each)	3.674	-	-
Description: 40 millimeter (mm) Counter Defilade Grenade and Fire Control Systems; Armor Processing; Energy Absorbing Material for Improved Blunt Impact/Trauma Protection; Lightweight M3A1 Recoilless Rifle; and Solar Power Shelter System.			
FY 2014 Accomplishments: Completed and Transitioned: 40mm Counter Defilade Grenade and Fire Control Systems, a new prototype 40mm round capable of providing an enhanced lethality solution for defeating personnel targets in defilade. Completed Armor Processing, Small Arms Protective Inserts (SAPI) plates for personal body armor being fabricated by a new isostatic and high pressure processing technique. Developed plans for testing Energy Absorbing Material for Improved Blunt Impact/Trauma Protection, a soft flexible material that stiffens upon impact for use in helmets and body armor to reduce blunt impact forces. Completed test plans for Lightweight M3A1 Recoilless Rifle, a reliable, battle-proven, reusable shoulder fired weapon system which will significantly reduce the weight burden on the Multi-role Anti-armor Anti-tank Weapon System weapon teams. Conducted planning meetings for Solar			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605130D8Z / <i>Foreign Comparative Testing</i>	Project (Number/Name) P130 / <i>Foreign Comparative Testing</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Power Shelter System, a new capability which utilizes renewable energy technology (solar power) as an alternative energy source to diesel fuel for powering equipment supporting Army base camps.			
<p>Title: Air Force Low Cost Innovative Projects (Projects Less Than One Million Dollars Each)</p> <p>Description: Air Portable Hot Mix Asphalt Plant; Web-Based Weather Portal; Rapid Airfield Damage Assessment Systems; Deployable Instrument Landing System (D-ILS); and Advanced Mobile Universal Electrical Tester (AMUET).</p> <p>FY 2014 Accomplishments: Completed and transitioned: Air Portable Hot Mix Asphalt Plant, a project that tests and qualifies a pre-production Air Portable Hot Mix Asphalt (HMA) Plant for the rapid production and delivery of HMA for airfield repairs using pre-packaged (pelletized) asphalt binder along with locally-available aggregate. Completed Web-Based Weather Portal, a project that tests and qualifies weather software to provide commercial-off-the-shelf capability to ingest, decode, and graphically display weather observations and forecast products. Procured test articles for Rapid Airfield Damage Assessment Systems, a project that tests and evaluates a system that detects airfield damage or objects on runways/taxiways that will damage aircraft. Evaluated Deployable Instrument Landing System (D-ILS), equipment that combines glideslope and localizer together to provide azimuth and elevation directions to approaching aircraft. Planned and evaluated Advanced Mobile Universal Electrical Tester (AMUET), a mobile, generic, modular, piece of automated test equipment used to collect test parameters of complete sub-system(s) under both depot and operational maintenance environments.</p>	2.294	-	-
<p>Title: Navy Low Cost Innovative Projects (Projects Less Than One Million Dollars Each)</p> <p>Description: Stabilized Small Arms Mount; Dual Purpose 25mm Ammunition for the Joint Strike Fighter; Seismic Detection System; Secondary Propulsion Thrusters; Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) Radio Frequency Amplifier (RFA); Automatic Target Recognition: Reducing MK18 Unmanned Underwater Vehicles (UUV) Mine Countermeasures Tactical Timeline; Computer Network Defense (CND) Advanced Persistent Threat (APT) Detection; H-1 Crash-resistant, Ballistic-tolerant, Fuel Cell Qualification; Mobile Gunnery Live Fire Monitoring System; and Horizon Reference System, Electroluminescent Panel Replacement.</p> <p>FY 2014 Accomplishments: Completed Stabilized Small Arms Mount, a highly reliable two-man portable system suitable for the harsh maritime and operational environments in which the warfighters of small-to-medium size craft operates. Completed Dual Purpose 25mm Ammunition for the Joint Strike Fighter, a project that tested the performance, reliability and safety of Armor Piercing Explosive (APEX) 25mm rounds for U.S. Navy, Marine Corps, and Air Force aircraft application. Completed Seismic Detection System, a project that tested and evaluated a sensor system that can detect the presence of human activity (walking, digging) associated with improvised explosive device emplacement, perimeter/border intrusion of unauthorized individuals and provides alerts when</p>	4.638	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605130D8Z / <i>Foreign Comparative Testing</i>	Project (Number/Name) P130 / <i>Foreign Comparative Testing</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
that activity occurs within a user defined geographical boundary. Completed Secondary Propulsion Thrusters, an Advanced Submarine Control System using a pump jet propulsion technology to improve ship control and operational performance. Completed Multifunctional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) Radio Frequency Amplifier (RFA), a project that tested and evaluated a RFA Shop Replaceable Unit (SRU). Collected data for Automatic Target Recognition: Reducing MK-18 Unmanned Underwater Vehicles (UUV) Mine Countermeasures Tactical Timeline, system capable of automatically identifying mine-like targets in sonar imagery from the in-service MK-18 Family of UUV Systems. Formulated Integrated Product Team and issued a Request for Information for Computer Network Defense (CND) Advanced Persistent Threat (APT) Detection, software that provides a critical step towards addressing advanced persistent threats (APTs), which is a current capability gap in the Computer Network Defense (CND) program of record. Developed plans for the H-1 crash-resistant, ballistic-tolerant, fuel cell in order to evaluate crashworthy self-sealing fuel cell technology to U.S. military standards for use on the UH-1Y and AH-1Z aircraft. Developed plans for Horizon Reference System, Electroluminescent Panel Replacement, a systematic upgrade to modernize the existing electroluminescent (EL) Panel Bar to Light Emitting Diode (LED) Technology on the shipboard Horizon Reference Set.			
Title: United States Special Operations Command (USSOCOM) Low Cost Innovative Projects (Projects Less Than One Million Dollars Each) Description: Electronic Underwater Navigation; Out-of-Band Night Vision Tubes; and Nano-steel FY 2014 Accomplishments: Conducted project planning and received test articles for Electronic Underwater Navigation, a project that assures the certainty of combat divers arriving at the intended assigned target, using an extremely accurate underwater navigation system. Conducted project planning and received test articles for Out-of-Band Night Vision Tubes, a visual augmentation system that expands the range of frequencies. Purchased test articles and developed test plans for Nano-steel, a material used to verify claims that Nano-steel provides superior ballistic protection at reduced weight and thickness.	1.271	-	-
Accomplishments/Planned Programs Subtotals	11.877	-	-

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605130D8Z / <i>Foreign Comparative Testing</i>	Project (Number/Name) P130 / <i>Foreign Comparative Testing</i>

E. Performance Metrics

Since the program's inception in 1980, Office of Secretary of Defense has invested about \$1.228 billion in FY 2014 constant year dollars on FCT projects. Of the evaluations that met the sponsors' requirements, there have been procurements worth over \$11.000 billion. In FY 2014, FCT had a transition rate of 64 percent for completed projects, exceeding the objective of 40 percent for demonstration programs.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605142D8Z I <i>Systems Engineering</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	78.000	38.205	44.683	37.655	-	37.655	37.569	37.580	37.586	38.161	Continuing	Continuing
P142: <i>Systems Engineering</i>	68.880	29.271	35.152	33.099	-	33.099	33.053	33.067	33.070	33.550	Continuing	Continuing
P143: <i>Program Protection</i>	9.120	3.928	4.531	4.556	-	4.556	4.516	4.513	4.516	4.611	Continuing	Continuing
P241: <i>Systems Engineering Research Center</i>	0.000	5.006	5.000	-	-	-	-	-	-	-	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, 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 and software engineering planning and contracting approaches to enhance reliability, availability, and maintainability on major defense acquisition programs (MDAPs); (3) the systems engineering plans (SEPs) for MDAPs including software, and systems engineering considerations in support of lifecycle management and sustainability; and (4) the inclusion of provisions relating to systems engineering and reliability in requests for proposals. The DASD(SE) reviews and approves the SEP for each MDAP, and monitors and reviews the systems engineering 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 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, 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 in the Department. DASD(SE) provides advocacy, oversight, and guidance to elements of the acquisition workforce responsible for systems engineering, development planning, lifecycle management and sustainability functions, and developing policies and guidance for the integration of specialty engineering functions.

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 an annual report to Congress on systems engineering activities and effectiveness.

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 and the Comprehensive Program Protection Planning process that implements a risk-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>
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based approach to protection of critical technology, components, and information in acquisition programs. This includes study and maturation of policy, guidance, and School of Science and Engineering (SSE) discipline fundamentals such as engineering methods, tools, and best practices. 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	39.606	44.246	44.256	-	44.256
Current President's Budget	38.205	44.683	37.655	-	37.655
Total Adjustments	-1.401	0.437	-6.601	-	-6.601
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	0.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.019	-			
• SBIR/STTR Transfer	-1.382	-			
• FFRDC SEC 8104	-	-0.063	-	-	-
• Realignment for Higher Priority Programs	-	-	-6.494	-	-6.494
• Economic Assumptions	-	-	-0.107	-	-0.107

Change Summary Explanation

Funding in the amount \$5.000 from P241 realigned to Engineering Science and Technology within PE 0603833D8Z.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>				Project (Number/Name) P142 / <i>Systems Engineering</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P142: <i>Systems Engineering</i>	68.880	29.271	35.152	33.099	-	33.099	33.053	33.067	33.070	33.550	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project (142) 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 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 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.
- Develop education and training materials for instructing, maintaining, and enhancing the defense acquisition workforce. Activities include: (1) developing guidance to enhance Systems Planning, Research, Development and Engineering (SPRDE) 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 software engineering courses, to ensure the curriculum represents the education and training requirements necessary to be a viable team member in the acquisition process.
- Drive an overall improvement in weapon system reliability through improved reliability engineering, reliability growth management, and reliability monitoring in program development contracting, execution, and sustainment.
- Prepare and submit annual reports to Congress on the Department’s capabilities and effectiveness in systems engineering and development planning.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P142 / <i>Systems Engineering</i>
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- Foster program protection planning methodology, system security engineering discipline, industry standards, and engagement with acquisition programs to support risk assessment and vulnerability mitigation.
- 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 Complexity Analysis, and systems engineering based technical trade off analysis and pre-program formulation stages.
- Provide necessary modeling and simulation policy and guidance, clarify the application of distributed simulation standards and work with the DoD modeling and simulation community to identify and promulgate required capabilities and competencies needed to support acquisition modeling and simulations.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>Title: Systems Engineering Initiatives</p> <p>Description: The DASD(SE) provides objective assessments of program risk to support knowledge-based decision making by DoD leaders regarding DoD MDAPs and MAISs.</p> <p>FY 2014 Accomplishments: Strategic Thrust: Program Support</p> <ul style="list-style-type: none"> • Conducted deep-dive systems engineering reviews of MDAPs and special interest programs. • Expanded conduct of SE and execution risk assessments. • Expanded systems integration and development planning risk assessments. • Continued monitoring of programs, provided SE oversight to include all MDAPs, MAIS, and special interest programs. • Conducted systemic analysis and process management. • Expanded root cause analysis conducted during and after Program Support Reviews (PSRs). • Expanded detailed performance measurements and analysis. • Provided decision-quality information and recommendations to DABs, In Progress Reviews, Defense Space Acquisition Boards and Information Technology Advisory Boards. • Reviewed MDAP Request for Proposals for critical engineering requirements. <p>Strategic Thrust: Specialty Engineering</p> <ul style="list-style-type: none"> • Continued implementation of engineering policies for the integration of specialty engineering functions as part of the SE responsibility in the acquisition process including, but not limited to, cyber security; program protection in accordance with Reference (gc); software; reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management. • 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 impacted and developed new guidance, best practices, methods, processes, and tools to more effectively implement SE for Systems of Systems. 	29.271	35.152	33.099

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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P142 / <i>Systems Engineering</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Strategic Thrust: Work Force Development</p> <ul style="list-style-type: none"> • Workforce development: Functional Lead for Systems Planning, Research, Development and Engineering (SPRDE), Process Quality Management (PQM), all Department non-construction engineering and assist software engineering. • Built an enduring high performance engineering culture across the Department in Systems Engineering. • Outlined a Department plan for engineering workforce career development, focused on delivering critical Engineering content vs. teaching OSD acquisition policy. • Outlined a Department plan for engineering workforce rewards and recognition. • Outlined a strategy to show the value of systems engineering contributions to "design and manufacturing quality" in DoD acquisition systems. • Performed outreach to services and OSD to focus Department's attention and behavior on promoting an engineering culture. • Managed DoD sponsorship of the MITRE Federally Funded Research and Development Center (FFRDC). <p>Strategic Thrust: Engineering and Policy</p> <ul style="list-style-type: none"> • Supported Service and component implementation of 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. <p>Strategic Thrust: Systems Engineering Capabilities Assessment</p> <ul style="list-style-type: none"> • Conducted analysis of Military Departments' annual systems engineering self-assessments; conducted analysis of DoD's SE capability. • Authored DoD Annual Systems Engineering Report to Congress. • Worked jointly with Development Test & Evaluation (DT&E) to develop and track new measurable performance criteria. • Developed and strengthened component SE organization and capabilities. • 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 and TEMP's for MDAP's; developed program metrics to aid SE assessments and program execution. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Strategic Thrust: Early Systems Engineering and Development Planning</p> <ul style="list-style-type: none"> • Developed policy and guidance for development planning and early SE; oversaw its implementation within Services. • Performed early acquisition risk assessment including pre- milestone (pre-MS) A engagement with Joint Requirements Oversight Council processes. • Supported Services and COCOMs in pre-MS A formulation. • Supported requirements analyses and analysis of alternatives. • Supported initial capabilities document definition and development. <p><i>FY 2015 Plans:</i></p> <p>Strategic Thrust: Program Support Continue to:</p> <ul style="list-style-type: none"> • Conduct deep-dive systems engineering reviews of MDAPs and special interest programs. • Conduct SE and execution risk assessments. • Perform systems integration and development planning risk assessments. • Monitor programs, providing SE oversight to include all MDAPs, MAIS, and special interest programs. • Conduct systemic analysis and process management. • Expand root cause analysis conducted during and after Program Support Reviews (PSRs). • Expand use of detailed performance measurements and analysis. • Provide decision-quality information and recommendations to Defense Acquisition Boards(DABs), In Progress Reviews, Defense Space Acquisition Boards and Information Technology Advisory Boards. • Review MDAP Request for Proposals for critical engineering requirements. <p>Strategic Thrust: Specialty Engineering</p> <ul style="list-style-type: none"> • Develop engineering and policies for the integration of specialty engineering functions as part of the SE responsibility in the acquisition process including, but not limited to, cyber security; program protection in accordance with Reference (gc); software; reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management. • Conduct studies and analyses of methods, processes and tools to identify challenges and opportunities, and develop and promulgate best practices and guidance for applying SE to rapid development and acquisition. • Assess challenges and impact and develop new guidance, best practices, methods, processes, and tools to more effectively implement SE for Systems of Systems. <p>Strategic Thrust: Work Force Development</p> <ul style="list-style-type: none"> • Workforce development: Functional Lead for SPRDE, PQM, all Department non-construction engineering and assist software engineering. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P142 / <i>Systems Engineering</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Build an enduring high performance engineering culture across the Department in Systems Engineering. • Outline a Department plan for engineering workforce career development, focused on delivering critical Engineering content vs. teaching OSD acquisition policy. • Outline a Department plan for engineering workforce rewards and recognition. • Outline a strategy to show the value of systems engineering contributions to "design and manufacturing quality" in DoD acquisition systems. • Perform outreach to services and OSD to focus the Department's attention and behavior on promoting an engineering culture. • Manage DoD sponsorship of the MITRE FFRDC. <p>Strategic Thrust: Engineering and Policy</p> <ul style="list-style-type: none"> • Develop and update core SE policy, guidance and standards; review all acquisition policy for SE implications. • Provide advice and make 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. Issue guidance to and consult with the Heads of the DoD Components with respect to systems engineering and development planning in the DoD. • 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. <p>Strategic Thrust: Systems Engineering Capabilities Assessment</p> <ul style="list-style-type: none"> • Conduct analysis of Military Departments' systems engineering self-assessments; conduct analysis of DoD's SE capability. • Author DoD Annual Systems Engineering Report to Congress. • Work jointly with DT&E to develop and track new 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. • Store and analyze performance criteria in SEPs and TEMP's for MDAP's; develop program metrics to aid SE assessments and program execution. <p>Strategic Thrust: Early Systems Engineering and Development Planning</p> <ul style="list-style-type: none"> • Develop policy and guidance for development planning and early SE; oversee its establishment within Services. • Perform early acquisition risk assessment including pre-MS A engagement with Joint Requirements Oversight Council processes. • Support Services and COCOMs in pre-MS A formulation. • Support requirements analyses and analysis of alternatives. 			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<ul style="list-style-type: none"> • Support initial capabilities document definition and development. <p>FY 2016 Plans: Strategic Thrust: Program Support Continue to:</p> <ul style="list-style-type: none"> • Conduct deep-dive systems engineering reviews of major defense acquisition programs (MDAPs) and special interest programs. • Conduct SE and execution risk assessments. • Perform systems integration and development planning risk assessments. • Monitor programs, providing SE oversight to include all MDAPs, Major Automated Information Systems (MAIS), and special interest programs. • Conduct systemic analysis and process management. • Expand root cause analysis conducted during and after Program Support Reviews (PSRs). • Expand use of detailed performance measurements and analysis. • Provide decision-quality information and recommendations to DABs, In Progress Reviews, Defense Space Acquisition Boards and Information Technology Advisory Boards. • Review MDAP Request for Proposals for critical engineering requirements. <p>Strategic Thrust: Specialty Engineering</p> <ul style="list-style-type: none"> • Develop engineering and policies for the integration of specialty engineering functions as part of the SE responsibility in the acquisition process including, but not limited to, cyber security; program protection in accordance with Reference (gc); software; reliability, availability, and maintainability; modeling and simulation; configuration management; data management; and risk management. • Conduct studies and analyses of methods, processes, and tools to identify challenges and opportunities and develop and promulgate best practices and guidance for applying SE to rapid development and acquisition. • Assess challenges and impact and develop new guidance, best practices, methods, processes and tools to more effectively implement SE for Systems of Systems. <p>Strategic Thrust: Work Force Development</p> <ul style="list-style-type: none"> • Workforce development: Functional Lead for Systems Planning, Research, Development and Engineering (SPRDE), Process Quality Management (PQM), all Department non-construction engineering and assist software engineering. • Build an enduring high performance engineering culture across the Department in Systems Engineering. • Outline a Department plan for engineering workforce career development, focused on delivering critical Engineering content vs. teaching OSD acquisition policy. • Outline a Department plan for engineering workforce rewards and recognition. 			
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Outline a strategy to show the value of systems engineering contributions to "design and manufacturing quality" in DoD acquisition systems. • Perform outreach to services and OSD to focus the Department's attention and behavior on promoting an engineering culture. • Manage DoD sponsorship of the MITRE Federally Funded Research and Development Center (FFRDC). <p>Strategic Thrust: Engineering and Policy</p> <ul style="list-style-type: none"> • Develop and update core SE policy, guidance and standards; review all acquisition policy for SE implications. • Provide advice and make 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. Issue guidance to and consult with the Heads of the DoD Components with respect to systems engineering and development planning in the DoD. • 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. <p>Strategic Thrust: Systems Engineering Capabilities Assessment</p> <ul style="list-style-type: none"> • Conduct analysis of Military Departments' systems engineering self-assessments; conduct analysis of DoD's SE capability. • Author DoD Annual Systems Engineering Report to Congress. • Work jointly with DT&E to develop and track new 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. • 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. <p>Strategic Thrust: Early Systems Engineering and Development Planning</p> <ul style="list-style-type: none"> • Develop policy and guidance for development planning and early SE; oversee its establishment within Services. • Perform early acquisition risk assessment including pre-MS A engagement with Joint Requirements Oversight Council processes. • Support Services and COCOMs in pre-MS A formulation. • Support requirements analyses and analysis of alternatives. • Support initial capabilities document definition and development. 			
Accomplishments/Planned Programs Subtotals	29.271	35.152	33.099

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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 reviews (PSRs) 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 (OIPs), 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.
- Improved reliability engineering, reliability growth management, and reliability monitoring in program development contracting, execution and sustainment.
- Annual reports to Congress prepared and submitted on the Department's capabilities and effectiveness in systems engineering and development planning.
- 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>				Project (Number/Name) P143 / <i>Program Protection</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P143: <i>Program Protection</i>	9.120	3.928	4.531	4.556	-	4.556	4.516	4.513	4.516	4.611	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) must address cyber security 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, drive the need for better and smarter program protection planning and execution. Comprehensive Program Protection Planning links high level policies and practical expertise to specific acquisition practices, systems engineering activities, and risk reduction activities. Through this initiative the Department will pilot activities with the DIB to reduce risks in sharing and storing critical program information, better understand and mitigate supply chain risks, improve program protection planning, and improve and streamline program protection engineering. Activities carried out support implementation of DoD Directive 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.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Program Protection	3.928	4.531	4.556
<p>Description: Pilot activities with the DIB to reduce risks in sharing and storing critical program information, better understand and mitigate supply chain risks, improve program protection planning, and improve and streamline program protection engineering. Activities carried out support implementation of DoD Directive 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Provided support to Acquisition Category (ACAT) I programs to conduct broad program protection planning. - Conducted criticality analyses to determine system vulnerabilities. - Developed Program Protection Plans, and tracked progress to verify protection of critical program capabilities. - Reviewed ACAT I Program Protection Plans and provided recommendations for their approval to USD(AT&L). <p>• Advanced the state of the practice of systems security engineering.</p> <ul style="list-style-type: none"> - Continued development of methodology to identify and mitigate security risk. - Courseware, guidance dissemination, mentoring of Service teams, training, and outreach. <p>FY 2015 Plans: Continue to:</p> <ul style="list-style-type: none"> • Provide support to Acquisition Category (ACAT) I programs to conduct broad program protection planning. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P143 / <i>Program Protection</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 security risk. - Courseware, guidance dissemination, mentoring of Service teams, training, and outreach. <p><i>FY 2016 Plans:</i> Continue to:</p> <ul style="list-style-type: none"> • 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 security risk. - Courseware, guidance dissemination, mentoring of Service teams, training, and outreach. 			
Accomplishments/Planned Programs Subtotals	3.928	4.531	4.556

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) reducing risks in sharing and storing critical program information, (2) better understanding and mitigating supply chain risks, (3) improving program protection planning, and (4) improving and streamlining program protection engineering.

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>				Project (Number/Name) P241 / <i>Systems Engineering Research Center</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P241: <i>Systems Engineering Research Center</i>	-	5.006	5.000	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: Systems Engineering Research Center	5.006	5.000	-
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 2014 Accomplishments: Provided enhanced engineering methods, processes, and tools which made significant improvements in four areas: Systems Engineering Transformation: -- Tradespace and Affordability. Developed and applied tradespace analysis methods for system "-ilities" such as affordability, safety and resilience, with a focus on satellites and ship design. -- Interactive Model Centric Systems Engineering. Initiated research in human-model interaction to rapidly conceive and develop defense systems. -- Agile Systems Engineering. Initiated research to identify practices outside of traditional systems engineering to improve the effectiveness and efficiency of current methods. -- Quantitative Risk. Started pilot effort to apply condition-based methods to quantitatively identify, assess, and mitigate risks for developing complex defense systems. Human Capital Development:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P241 / <i>Systems Engineering Research Center</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>-- Defense Workforce Evolution. Produced technical reports identifying the characteristics and competencies of effective systems engineers, with analysis of career paths and effective mentoring approaches.</p> <p>-- Systems Engineering Expert Knowledge. Initiated effort to develop engineering case studies to support the educational needs of systems engineers.</p> <p>-- Experience Acceleration. Piloted immersive UAV design experience in senior engineering courses at Defense Acquisition University.</p> <p>-- Engineering Capstone Marketplace. Established prototype marketplace for student teams to identify and perform multi-disciplinary system design projects for DoD sponsors.</p> <p>Trusted Systems:</p> <p>-- Systems Aware Cyber Security. Developed secure sentinel design pattern and operational concepts for detecting and reconfiguring autonomous systems to defend against cyber-attacks.</p> <p>-- Systemic Assurance. Initiated research to develop methods to incrementally combine different systems assurance capabilities and data sources to rapidly develop systems with well-defined assurance properties.</p> <p>Enterprises and System of Systems:</p> <p>-- Enterprise Systems Analysis. Developed and applied enterprise analysis methods to understand the policies and incentives affecting counterfeit parts in the DoD supply chain.</p> <p>-- Analytic Workbench for System of Systems. Developed analysis methods and tools to understand the behavior of system of systems to inform tradeoffs in requirements, architecture changes, and implementation technologies.</p> <p>FY 2015 Plans:</p> <p>Continue to enhance engineering methods, processes and tools (MPTs) to improve in the following areas:</p> <p>(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;</p> <p>(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;</p> <p>(3) Trusted Systems: secure defense systems from cyber and other threats through systemic security approaches that complement incomplete current perimeter/network defense methods; and</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605142D8Z / <i>Systems Engineering</i>	Project (Number/Name) P241 / <i>Systems Engineering Research Center</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
(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	5.006	5.000	-

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605151D8Z / <i>Studies and Analysis Support - OSD</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	5.901	5.806	2.660	3.015	-	3.015	3.339	3.050	2.468	2.470	Continuing	Continuing
001: <i>Joint Service Training & Readiness System Development Program</i>	5.901	5.806	2.660	3.015	-	3.015	3.339	3.050	2.468	2.470	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	5.837	2.665	3.035	-	3.035
Current President's Budget	5.806	2.660	3.015	-	3.015
Total Adjustments	-0.031	-0.005	-0.020	-	-0.020
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.002	-			
• SBIR/STTR Transfer	-0.029	-			
• Baseline Adjustment	-	-	-0.020	-	-0.020
• FFRDC	-	-0.005	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605151D8Z / <i>Studies and Analysis Support - OSD</i>				Project (Number/Name) 001 / <i>Joint Service Training & Readiness System Development Program</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
001: <i>Joint Service Training & Readiness System Development Program</i>	5.901	5.806	2.660	3.015	-	3.015	3.339	3.050	2.468	2.470	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 2014	FY 2015	FY 2016
Title: Joint Service Training & Readiness System Development	5.806	2.660	3.015
<p>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.</p>			
<p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Developed VW technology to support DoD training to include an overarching architecture encompassing a number of VW applications, as well as a VW Roadmap and Governance process to implement the VWF; • Assessed lessons learned on managing the force in a dynamic environment including self-selection for successive deployments; • Assessed workforce skills and analyzed training requirement to support the DoD Strategy for Operating in Cyberspace; 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605151D8Z / <i>Studies and Analysis Support - OSD</i>	Project (Number/Name) 001 / <i>Joint Service Training & Readiness System Development Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Identified and analyzed some of the benefits of early and effective incorporation of system training details into acquisition programs, particularly those with significant human systems interface requirements; • Evaluated the effectiveness of some SECDEF options provided for reducing force structure; • Reviewed current programs and provided options to lower or stop suicide rates; • Supported implementation of policy changes from drug demand reduction program; • Validated the performance of the commercial screening technology to determine the prevalence of use of synthetic drugs in Service member samples, developed appropriate screening and confirmation cutoff concentrations, and developed confirmation procedures; • Updated alternative approaches to Force Generation and Management; • Assessed some training requirements for non-standard force requirements; • Assessed changes in accession standards during the drawdown; • Developed and evaluated expanded family programs; • Continued to investigate the alternatives for a continuum of service; • Modified the Request for Forces (RFF) system and processes to meet the needs of the COCOMs; • Developed a model that calculates the cost and discounted present value of alternative military career management paradigms; and • Analyzed existing cultural training programs and assessed developments in the area of cultural competency training. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> . Assess effectiveness of VW technology used to support DoD training; . Continue to assess workforce skills and analyze training requirement to support the DoD Strategy for Operating in Cyberspace; . Plan and assess additional training requirements for non-standard force requirements; . Identify and analyze additional benefits of early and effective incorporation of system training details into acquisition programs, particularly those with significant human systems interfaces; . Evaluate effectiveness and impacts of additional options for reducing force structure; . Assess effectiveness of studied programs to lower or stop suicide rates; . Assess effectiveness of policy changes in the drug demand reduction program; . Continue to investigate the additional opportunities for a continuum of service in a downsizing military; . Assess effectiveness of alternative approaches for enhancing and managing regionally prepared forces and organizations; . Develop and assess efforts to streamline credentialing and licensing of technical training of Service members to help ease transition to civilian life; . Assess workforce skills and analyze training requirement to support DoD's expanded use of unmanned systems; and . Continue to investigate modeling and simulation technologies to increase training effectiveness and lower costs. <p>FY 2016 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605151D8Z / <i>Studies and Analysis Support - OSD</i>	Project (Number/Name) 001 / <i>Joint Service Training & Readiness System Development Program</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> . Continue to assess workforce skills and analyze training requirement to support the DoD Strategy in evolving areas of specialization; . 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 systems acquisitions; . Continue to investigate modeling and simulation technologies to increase training effectiveness and lower costs; and . Respond to Congressional mandates and directives. 			
Accomplishments/Planned Programs Subtotals	5.806	2.660	3.015

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	8.186	4.816	4.359	5.287	-	5.287	5.463	5.315	5.171	5.256	Continuing	Continuing
P161: <i>Nuclear Matters</i>	8.186	4.816	4.359	5.287	-	5.287	5.463	5.315	5.171	5.256	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	4.999	4.366	4.402	-	4.402
Current President's Budget	4.816	4.359	5.287	-	5.287
Total Adjustments	-0.183	-0.007	0.885	-	0.885
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.183	-			
• Internal Realignment	-	-	0.900	-	0.900
• FFRDC	-	-0.007	-	-	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>
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• Economic Assumptions	-	-	-0.015	-	-0.015
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Change Summary Explanation

Internal realignment of all contract support funding under this Management Support PE. Moves \$900K from PE 0603161D8Z to 0605161D8Z.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>				Project (Number/Name) P161 / <i>Nuclear Matters</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P161: <i>Nuclear Matters</i>	8.186	4.816	4.359	5.287	-	5.287	5.463	5.315	5.171	5.256	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 2014	FY 2015	FY 2016
Title: Nuclear Weapons Council (NWC)	0.571	0.629	0.703
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 2014 Accomplishments: - Oversaw 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 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>	Project (Number/Name) P161 / <i>Nuclear Matters</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>- 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</p> <p>FY 2016 Plans:</p> <p>- 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</p>				
<p>Title: International Programs</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <p>- Executed confidence building programs of cooperation with international partners. - Sponsored international partners at national-level nuclear weapons accident/incident exercises.</p> <p>FY 2015 Plans:</p> <p>- Execute confidence building programs of cooperation with international partners. - Sponsor international partners at national-level nuclear weapons accident/incident exercises.</p> <p>FY 2016 Plans:</p> <p>- Execute confidence building programs of cooperation with international partners. - Sponsor international partners at national-level nuclear weapons accident/incident exercises.</p>		0.502	0.296	0.319
<p>Title: Nuclear Surety</p> <p>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)).</p> <p>FY 2014 Accomplishments:</p> <p>- Conducted 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</p>		0.783	0.650	0.773

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>	Project (Number/Name) P161 / <i>Nuclear Matters</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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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."

- Supported activities that support nuclear surety policy and provide OSD oversight of the Nuclear Surety program.

FY 2015 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 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.

Title: Stockpile Transformation

Description: To meet 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 2014 Accomplishments:

- Conducted 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."
 - Managed DoD RDT&E activities for nuclear warheads to include B61, W76, W78, W80(0,1), B83, W87, W88 Weapons.
 - Supported studies for warhead replacement.

FY 2015 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.

1.215	1.083	1.136	

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>	Project (Number/Name) P161 / <i>Nuclear Matters</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Support studies for warhead replacement. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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. 				
<p>Title: Survivability and Weapons of Mass Destruction (WMD)</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Oversaw the Nuclear Defense Portfolio. - Planned and coordinated the activities of the National Nuclear Forensics Steering Committee and Working Group. - Developed OSD-wide approach to overseeing Global Nuclear Defense missions within DoD. - Oversaw the integration of all DoD nuclear defense capabilities in support of the Global Nuclear Defense Initiative. - Supported International Conference on Nuclear Security and Technology Demonstrations as part of the Nuclear Security Summit process. <p>FY 2015 Plans:</p> <p>Continue to:</p> <ul style="list-style-type: none"> - 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. <p>FY 2016 Plans:</p> <p>Continue to:</p> <ul style="list-style-type: none"> - 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. 		0.916	0.839	0.744
<p>Title: Nuclear Matters Support Program</p> <p>Description: The Nuclear Matters support program conducts studies / analyses; DoD-NNSA Nuclear Weapons Council activities; and provides funding for analytical support functions.</p>		0.829	0.862	0.723

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>	Project (Number/Name) P161 / <i>Nuclear Matters</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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<p><i>FY 2014 Accomplishments:</i></p> <ul style="list-style-type: none"> - Submitted annual reports to the President and the Congress. - Oversaw DoD/DOE relationship regarding the survivability and surety of the national nuclear stockpile. - Served as DoD Sigma 15 Approval Authority (Interface with DOE/NNSA). - Addressed Freedom of Information Act and Mandatory Declassification Requests. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - 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. <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - 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. 			
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<p><i>Title:</i> Physical Security and PPBE Support</p> <p><i>Description:</i> 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.</p> <p><i>FY 2016 Plans:</i></p> <ul style="list-style-type: none"> - 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
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Accomplishments/Planned Programs Subtotals	4.816	4.359	5.287
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C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605161D8Z / <i>Nuclear Matters</i>	Project (Number/Name) P161 / <i>Nuclear Matters</i>
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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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605170D8Z I <i>Support to Networks and Information Integration</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	13.665	6.090	27.861	5.289	-	5.289	5.401	5.701	6.058	6.141	Continuing	Continuing
002: <i>Defense Architecture Support</i>	2.071	1.050	0.923	0.912	-	0.912	0.931	0.983	1.044	1.059	Continuing	Continuing
003: <i>Integrated Planning and Management</i>	3.571	1.728	24.028	1.501	-	1.501	1.533	1.618	1.719	1.742	Continuing	Continuing
004: <i>PNT Navigation</i>	8.023	3.312	2.910	2.876	-	2.876	2.937	3.100	3.295	3.340	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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	6.277	27.901	5.243	-	5.243
Current President's Budget	6.090	27.861	5.289	-	5.289
Total Adjustments	-0.187	-0.040	0.046	-	0.046
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.184	-			
• Program Adjustment	-0.003	-	0.060	-	0.060
• FFRDC Reduction	-	-0.040	-	-	-
• Economic Assumptions	-	-	-0.014	-	-0.014

Change Summary Explanation

FY 2014: SBIR/STTR Reduction -0.184 million, Program Adjustment -0.003 million.

FY 2015: FFRDC Reduction -0.040 million.

FY 2016: Economic Assumptions -0.014 million, Program Adjustment 0.060 million.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
002: Defense Architecture Support	2.071	1.050	0.923	0.912	-	0.912	0.931	0.983	1.044	1.059	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 and solution architecture products. This work includes improvements to processes that support the Department’s enterprise architecture (EA) registry, catalog and navigation map called the DoD Architecture Registry System (DARS). DARS serves as the Department’s primary catalog of architecture data holdings and provides users the ability to register holdings metadata and search, retrieve, and use DoD architecture data in federated architecture data repositories across DoD. It provides a key component of the Department’s net-centric data management capability by federating EA data across the Department. It also enables alignment of program architecture components with the Federal Enterprise Architecture Business Reference Model - consistent with OMB directives for exhibit 300s - via the DoD Business Reference Model. DARS implements a federated search capability and metadata catalog that will interoperate with the Department’s Net-Centric Enterprise Discovery Service and enterprise content metadata catalog. Architecture metadata is searchable using the DARS federated discovery web service. The discovery search results provide links to architecture data that is retrievable based on user roles and access permissions. Implementations are accessible on both the NIPRNET (unclassified) and SIPRNET (Collateral Classified). Key features of the DARS program focus on: (1) Making 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 are collaborating in the development of DARS federation web services via the Federated Joint Architecture Working Group under the auspices of the DoD Enterprise Architecture Summit to ensure DoD-wide access to and usability of all components of the composite DoD enterprise architecture model.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Architecture Support	1.050	0.923	0.912
FY 2014 Accomplishments:			
Designed a mechanism for managing and cataloging DoD Enterprise Architecture products in DARS.			
- Analyzed DoD EA products in support of DoD’s POM Issue process.			
- Developed EA guidance (including best practices) for use by DoD architects			
- Analyzed DoD solution architecture in support of Joint Information Environment (JIE) implementation			
- Developed the DoD JIE Enterprise Architecture to include Capability, Operational, Systems, Technical, and All Views.			
FY 2015 Plans:			
Continue IT Enterprise and solution architecture development, analysis, and registration processes.			
FY 2016 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 002 / <i>Defense Architecture Support</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Continue IT Enterprise and solution architecture development, analysis, and registration processes.			
Accomplishments/Planned Programs Subtotals	1.050	0.923	0.912

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
003: <i>Integrated Planning and Management</i>	3.571	1.728	24.028	1.501	-	1.501	1.533	1.618	1.719	1.742	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 2014	FY 2015	FY 2016
Title: Integrated Planning and Management	1.728	24.028	1.501
FY 2014 Accomplishments:			
Maintained and enhanced architecture products, conducted testing analysis and systems engineering to enable national security systems and applications are validated to provide assured communications in support of senior leadership.			
- Continued the efforts for fielding robust, modernized and secure, mobile (smart phone and tablet) devices and services for senior leadership, for use world-wide. Included initial execution activities for the Senior Leader Communications Modernization Implementation Plan (SLSCM IP) released January 2014.			
- Continued to enhance the scope of quantitative voice quality testing (Phantom Signal Program) and associated analysis and validation activities. Multiple test events were planned, executed and associated analysis was conducted.			
- Continued risk reduction and engineering efforts within a flexible and dynamic test bed environment for senior leader solutions and infrastructure advancement validation. Efforts included the development of 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 communications. Efforts were closely worked with the broader stakeholder community and leveraged efforts/funding by the broader community National Security and Emergency Preparedness (NS/EP) community (included support to the Executive Order (EO) 13618).			
FY 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 003 / <i>Integrated Planning and Management</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>\$22.500 million – classified program – Details can be provided at a higher classification under separate cover.</p> <p>\$1.527 million:</p> <ul style="list-style-type: none"> - 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 and vehicular 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). <p><i>FY 2016 Plans:</i></p> <p>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.</p> <ul style="list-style-type: none"> - 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 and vehicular 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). 			
Accomplishments/Planned Programs Subtotals	1.728	24.028	1.501

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 003 / <i>Integrated Planning and Management</i>

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

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
004: PNT Navigation	8.023	3.312	2.910	2.876	-	2.876	2.937	3.100	3.295	3.340	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 2014	FY 2015	FY 2016
Title: PNT Navigation	3.312	2.910	2.876
<p>FY 2014 Accomplishments:</p> <p>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:</p> <ul style="list-style-type: none"> - Management of the International Supplement to GPS Security Policy - Management of the Information Assurance/COMSEC Supplement to GPS Security Policy - Management of the GPS Security Policy - 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 - Management of PNT Navigation Warfare Instruction and Annexes to all the Operations Plans (OPLANS) and Contingency Plans (CONPLANS) in coordination with US STRATCOM - Continued development of 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 her 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) - Completed drafting of the 2014 Federal Radionavigation Plan (FRP); finalized 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 004 / <i>PNT Navigation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Managed and implemented 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 - Developed additional Instructions for public affairs, receiver certification, and security policy. Developed GPS Security Policy as DoDM and expanded scope to include all source PNT - Conducted an inventory of DoD GPS receivers. - Analyzed and promoted alternative PNT delivery means for inclusion in the force structure for force protection. - Established PNT Integration Working Group (PING) <p><i>FY 2015 Plans:</i> 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:</p> <ul style="list-style-type: none"> - 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 - Perform annual update of National Five-year Plan for Space-Based Positioning, Navigation and Timing (PNT) - Begin drafting 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 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 004 / <i>PNT Navigation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>- 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</p> <p>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:</p> <ul style="list-style-type: none"> - 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 - 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 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605170D8Z / <i>Support to Networks and Information Integration</i>	Project (Number/Name) 004 / <i>PNT Navigation</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- 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			
Accomplishments/Planned Programs Subtotals	3.312	2.910	2.876

C. Other Program Funding Summary (\$ in Millions)

N/A

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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605200D8Z / <i>General Support to OUSD(I)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	20.993	6.466	2.850	2.120	-	2.120	2.274	2.414	2.593	2.615	Continuing	Continuing
001: <i>Developmental Activities</i>	11.018	3.292	-	-	-	-	-	-	-	-	-	14.310
002: <i>Sensitive Activities</i>	9.265	2.447	2.113	1.385	-	1.385	1.412	1.529	1.681	1.695	Continuing	Continuing
003: <i>Defense Civilian Intelligence Personnel System</i>	0.710	0.312	0.277	0.275	-	0.275	0.402	0.425	0.452	0.460	Continuing	Continuing
004: <i>ISR Operations</i>	0.000	0.415	0.460	0.460	-	0.460	0.460	0.460	0.460	0.460	Continuing	Continuing

A. Mission Description and Budget Item Justification

001: Developmental Activities provided innovative approaches to address intelligence, intelligence related capabilities and intelligence sharing. Funding transfers to Air Force starting in FY 2015.

002: 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)).

003: 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 Defense Intelligence Organizational Server, 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.

004: ISR Operations -The Sub-Project funds two initiatives. The ISR Metrics Initiative was funded with FY14 funds only, and the ISR S&T Advisor will be funded with FY15 and beyond funds. See Exhibit R-2A for further details.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605200D8Z / <i>General Support to OUSD(I)</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	6.466	2.855	2.931	-	2.931
Current President's Budget	6.466	2.850	2.120	-	2.120
Total Adjustments	-	-0.005	-0.811	-	-0.811
• Congressional General Reductions	-	-0.005			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Realignment of Funds to OSD O&M	-	-	-0.800	-	-0.800
• Departmental Adjustments	-	-	-0.011	-	-0.011

Change Summary Explanation

FY 2016 program adjustments: Funding realigned to O&M appropriation in order to sustain program in the Operations and Maintenance phase.

FY 2015 program decrease is a result of funding for Developmental Activities transferring to Air Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / General Support to OUSD(I)	Project (Number/Name) 001 / Developmental Activities
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
001: <i>Developmental Activities</i>	11.018	3.292	-	-	-	-	-	-	-	-	-	14.310
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program focused on developmental technologies, methodologies, and capabilities. These activities provided unique and innovative approaches to address intelligence, intelligence related capabilities and intelligence sharing initiatives.

Funding transfers to Air Force beginning in FY 2015.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Developmental Activities	3.292	-	-
FY 2014 Accomplishments: Leveraged technologies, assessed innovative capabilities and developed methodologies to support the Defense Intelligence Enterprise.			
Accomplishments/Planned Programs Subtotals	3.292	-	-

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / General Support to OUSD(I)	Project (Number/Name) 002 / Sensitive Activities
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
002: Sensitive Activities	9.265	2.447	2.113	1.385	-	1.385	1.412	1.529	1.681	1.695	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 2014	FY 2015	FY 2016
Title: Sensitive Activities	2.447	2.113	1.385
FY 2014 Accomplishments: (U) Continued technology development and concept evaluation for applications in support of OUSD(I).			
FY 2015 Plans: (U) Will continue technology development and concept evaluation for applications in support of OUSD(I).			
FY 2016 Plans: (U) Further continue technology development and concept evaluation for applications in support of OUSD(I).			
Accomplishments/Planned Programs Subtotals	2.447	2.113	1.385

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605200D8Z / General Support to OUSD(I)				Project (Number/Name) 003 / Defense Civilian Intelligence Personnel System			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
003: Defense Civilian Intelligence Personnel System	0.710	0.312	0.277	0.275	-	0.275	0.402	0.425	0.452	0.460	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Defense Civilian Intelligence Personnel System was authorized by Public Law 104-201, effective 01 October 1996 and codified in 10 USC 1601-1614. It provides the Defense Intelligence Enterprise 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 Defense Intelligence Enterprise 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 Global Force Management Defense Intelligence Organizational Server. Performance Appraisal Application is a performance management tool used by the Military Services Intelligence Components, Defense Security Service and OUSD(I). The Global Force Management Defense Intelligence Organizational Server tracks both civilian and military positions associated grades and skill levels and hierarchical organizational relationships.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Civilian Intelligence Personnel System (DCIPS)	0.312	0.277	0.275
FY 2014 Accomplishments:			
Continued refining design enhancements to improve the effectiveness of the existing DCIPS performance management software and the Global Force Management (GFM) Defense Intelligence Organizational Server (DIOS). GFM DIOS completed development for Common Access Point (CAP) Phase 1, implemented in March 2014, began development of CAP Phase 2 and converted to the Information Exchange Data Model (IEDM) standard which eliminates proprietary software standards thus reducing costs. Navy and Army GFM Organization Servers have already successfully completed conversion to IEDM.			
FY 2015 Plans:			
Will design enhancements to improve the effectiveness of the existing DCIPS performance management software and the GFM DIOS. Will develop modifications and improvements to the GFM DIOS as additional requirements are identified by the Joint Staff J-8. Some improvements include, but are not limited to, Phase 3 development of the CAP, improved security and developing a capability to report system health and data quality.			
FY 2016 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / General Support to OUSD(I)	Project (Number/Name) 003 / Defense Civilian Intelligence Personnel System

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Continue 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	0.312	0.277	0.275

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0305192D8Z: Defense Civilian Intelligence Personnel System	2.002	1.728	1.795	-	1.795	1.815	1.850	1.792	1.800	Continuing	Continuing

Remarks
Funding will be used to develop policy, oversee implementation, assess and continuously improve the effectiveness of Defense Civilian Intelligence Personnel (DCIPS) human capital programs across the Defense Intelligence Enterprise. 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / General Support to OUSD(I)	Project (Number/Name) 004 / ISR Operations
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
004: <i>ISR Operations</i>	-	0.415	0.460	0.460	-	0.460	0.460	0.460	0.460	0.460	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The ISR Metrics Initiative has developed, expanded, and enhanced a prototype framework to ingest and process asset allocation, requirement, tasking and post-mission artifacts and has collected sensor data and analyst intelligence products in order to provide semi-automated assessments for CENTCOM/Joint Intel Intelligence, Surveillance and Reconnaissance Assessments (CCJ2-ISRA) analysts. Through the use of state-of-the-art semantic processing and advanced techniques in computer data analysis, human-generated semi-structured employment artifacts have been compared to collected sensor data in order to adjudicate the collection effectiveness across required time, area, and intended utility for multiple sensor modalities. Resultant metrics and associated metadata have been stored in an enterprise database, which can be exported to support both current and future analyses.

The S&T Advisor provides expert engineering and technical assessments on a wide range of ISR topics, establishes and maintains interfaces with the senior scientific and technical directorates within USD(I), the military services and the Combat Support Agencies and integrates ISR Operations technology roadmaps with related program plans and initiatives.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: ISR Operations	0.415	0.460	0.460
Description: ISR Metrics Initiative (FY 2014) has developed, expanded and enhanced a prototype framework to ingest and process asset allocation, requirements, tasking and post-mission artifacts and has accumulated collected sensor data and analyst intelligence products in order to produce semi-automated assessment products for CCJ2-ISRA analysts.			
The S&T Advisor (FY 2015 and beyond) provides expert engineering and technical assessments on a wide range of ISR topics. It establishes and maintains interfaces with the senior scientific and technical directorates within USD(I), the military services and the combat support agencies, and integrates ISR Operations technology roadmaps with related program plans and initiatives.			
FY 2014 Accomplishments: The ISR Metrics Initiative adjudicated collection effectiveness across required time, area and intended utility for multiple sensor modalities through the use state-of-the-art semantic processing and advanced techniques in computer data analysis that compared human-generated semi-structured employment artifacts with collected sensor data.			
FY 2015 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605200D8Z / <i>General Support to OUSD(I)</i>	Project (Number/Name) 004 / <i>ISR Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>The S&T Advisor will provide expert engineering and technical assessments on a wide range of ISR topics. Continue to establish and maintain interfaces with the senior scientific and technical directorates within USD(I), the military services and the combat support agencies and integrate ISR Operations technology roadmaps with related program plans and initiatives.</p> <p>FY 2016 Plans: Continue to provide expert engineering and technical assessments on a wide range of ISR topics. Continue to establish and maintain interfaces with the senior scientific and technical directorates within USD(I), the military services and the combat support agencies and integrate ISR Operations technology roadmaps with related program plans and initiatives.</p>			
Accomplishments/Planned Programs Subtotals	0.415	0.460	0.460

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605502D8Z I <i>Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	54.815	55.640	-	-	-	-	-	-	-	-	Continuing	Continuing
P502: <i>SBIR</i>	48.525	55.640	-	-	-	-	-	-	-	-	Continuing	Continuing
P500: <i>STTR</i>	6.290	-	-	-	-	-	-	-	-	-	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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	55.640	-	-	-	-
Total Adjustments	55.640	-	-	-	-
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	55.640	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502D8Z / <i>Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)</i>	Project (Number/Name) P502 / SBIR
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P502: SBIR	48.525	55.640	-	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: SBIR	55.640	-	-
Description: A set-aside program for small business to engage in defense R&D with potential for commercialization.			
FY 2014 Accomplishments: Funds are used for award of R&D contracts to small businesses under the Congressionally mandated Small Business Innovation Research (SBIR) Program in accordance with 15USC638. Research and Development is performed in the key technology areas defined by the Army, Navy, Air Force and various agencies/programs within the Office of the Secretary of Defense. Technology areas across the Department include, but are not limited to, cyber technology, energy and power technology, biomedical and air, ground and sea platforms. Requirements are aligned with the better buying power initiative, providing an avenue for technology innovation and refresh for legacy defense acquisition programs.			
Accomplishments/Planned Programs Subtotals	55.640	-	-

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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502D8Z / <i>Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR)</i>	Project (Number/Name) P500 / <i>STTR</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P500: <i>STTR</i>	6.290	-	-	-	-	-	-	-	-	-	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)

N/A

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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605790D8Z I <i>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	3.255	1.790	1.631	2.169	-	2.169	2.254	2.393	2.586	2.621	Continuing	Continuing
P518: <i>SBIR/Challenge Admin</i>	3.255	1.790	1.631	2.169	-	2.169	2.254	2.393	2.586	2.621	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) 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 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) through the Assistant Secretary of Defense for Research & Engineering. DoD components actively participating in the STTR Program include the: Army, Navy, Air Force, DARPA and MDA.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	1.857	1.634	2.183	-	2.183
Current President's Budget	1.790	1.631	2.169	-	2.169
Total Adjustments	-0.067	-0.003	-0.014	-	-0.014
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-	-	-	-	-
• Other Program Adjustments	-0.067	-	-	-	-
• FFRDC	-	-0.003	-	-	-
• Economic Assumptions	-	-	-0.014	-	-0.014

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605790D8Z / <i>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</i>				Project (Number/Name) P518 / <i>SBIR/Challenge Admin</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P518: <i>SBIR/Challenge Admin</i>	3.255	1.790	1.631	2.169	-	2.169	2.254	2.393	2.586	2.621	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 2014	FY 2015	FY 2016
Title: SBIR/Challenge Admin	1.790	1.631	2.169
<p>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:</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(4) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in the DoD SBIR Commercialization Readiness Program (CRP); and</p> <p>(5) Prepare all reports mandated by law and policy.</p> <p>FY 2014 Accomplishments:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605790D8Z / <i>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</i>	Project (Number/Name) P518 / <i>SBIR/Challenge Admin</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>(U) FY 2014 accomplishments include program administrative oversight, coordination and execution for the DoD SBIR/STTR Programs. Specifically, DoD OSBP provided policy guidance and program oversight for the execution of 19 DoD Component SBIR/STTR budgets. Additional accomplishments include:</p> <p>(1) Coordinated and executed all required administrative functions of the DoD SBIR/STTR Programs including the development of technical topics, preparation of SBIR/STTR R&D solicitations, and receipt of proposal responses;</p> <p>(2) Developed new DoD outreach and commercialization Program Management Plans (PMP); initiated a DoD outreach working group targeted at increasing SBIR/STTR outreach to underrepresented states;</p> <p>(3) Created and implemented new SBIR/STTR automated waivers, forms and notifications system; created and documented new and existing SBIR/STTR processes such as transition benchmarking, topic generation and solicitation process efficiencies which resulted in a reduction of this timeline by 125 days annually;</p> <p>(4) Standardized transition planning tools and processes to increase the rate of transition of SBIR/STTR developed technologies into Programs of Record (POR) and fielded systems;</p> <p>(5) Conducted a gap analysis for missing, congressionally required statistical data; incorporated new data collection fields and worked closely with Small Business Administration (SBA) to ensure those fields were included in the annual SBIR and STTR reports to Congress.</p> <p>FY 2015 Plans:</p> <p>(U) FY 2015 plan includes program administration, coordination, and execution of the SBIR/STTR Program. Specifically, provide policy guidance and oversight regarding execution of the FY 2015 DoD SBIR/STTR budget between 13 Components to include:</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(5) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in DoD Commercialization Readiness Program (CRP); and</p> <p>(6) Prepare all reports mandated by law and policy.</p> <p>FY 2016 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605790D8Z / <i>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</i>	Project (Number/Name) P518 / <i>SBIR/Challenge Admin</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<p>(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:</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(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;</p> <p>(5) Coordinate oversight, collect results, track execution and provide reporting of Phase II technology transition in DoD Commercialization Readiness Program (CRP); and</p> <p>(6) Prepare all reports mandated by law and policy.</p>			
Accomplishments/Planned Programs Subtotals	1.790	1.631	2.169

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 modify automated processes across the entire SBIR/STTR lifecycle; 3) Develop and conduct an aggressive outreach program, especially the planning and 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-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605790D8Z / <i>Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</i>	Project (Number/Name) P518 / <i>SBIR/Challenge Admin</i>

III technology transition management and support of the DoD SBIR Commercialization Readiness Program; and 5) Prepare all reports required of the SBIR/STTR Programs as mandated by law and policy.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	9.393	22.074	13.960	-	13.960	24.809	26.084	28.033	28.331	Continuing	Continuing
P796: <i>Laboratory Resource Management</i>	-	1.767	12.340	2.038	-	2.038	3.456	3.666	3.897	3.950	Continuing	Continuing
P797: <i>Defense Technology Analysis</i>	-	4.439	4.880	3.532	-	3.532	5.153	5.124	5.678	5.755	Continuing	Continuing
P798: <i>Defense Support Teams</i>	-	2.285	1.817	1.471	-	1.471	2.318	2.307	2.423	2.455	Continuing	Continuing
P579: <i>Critical Technology Assessments</i>	-	0.902	0.603	0.800	-	0.800	1.317	1.333	1.441	1.460	Continuing	Continuing
P102: <i>Data Vulnerability Tiger Team</i>	-	-	2.434	6.119	-	6.119	12.565	13.654	14.594	14.711	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$4.870 million to account for the availability of prior year execution balances.

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 it 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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>
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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.

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)	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	8.332	12.105	15.389	-	15.389
Current President's Budget	9.393	22.074	13.960	-	13.960
Total Adjustments	1.061	9.969	-1.429	-	-1.429
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.367	-			
• SBIR/STTR Transfer	-0.306	-			
• FFRDC Sec 8104	-	-0.031	-	-	-
• Baseline Increase	-	-	3.481	-	3.481
• Economic Assumptions	-	-	-0.040	-	-0.040
• Reduction to account for prior year execution balances	-	-	-4.870	-	-4.870

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: P796: *Laboratory Resource Management*

Congressional Add: *Defense Technology Transfer Program*

Congressional Add Subtotals for Project: P796

Congressional Add Totals for all Projects

	FY 2014	FY 2015
	-	10.000
	-	10.000
	-	10.000

Change Summary Explanation

The Data Vulnerability Tiger Team is a new project, P102, within the DTA PE beginning in FY 2015.

Funding decreases were used to pay for higher priority DoD bills.

NOTE: The FY 2016 funding request was reduced by \$4.870 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P796 / <i>Laboratory Resource Management</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P796: Laboratory Resource Management</i>	-	1.767	12.340	2.038	-	2.038	3.456	3.666	3.897	3.950	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 2014	FY 2015	FY 2016
Title: Defense Laboratory Office	1.767	2.340	2.038
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 2014 Accomplishments:			
<ul style="list-style-type: none"> • Executed a quantitative assessment of the DoD in-house laboratory system. Product is a companion report to the USD(AT&L) Acquisition Program Performance report. • Continued refinement and analysis of laboratory Circulating Tumor Cells (CTCs); ensured laboratories are maintaining and/or developing needed capabilities in critical mission areas. • Initiated execution of new Technology Transfer (T2) Center of Excellence. • Supported congressional reporting requirements for laboratory Military Construction (MILCON), Section 219, personnel policies and others. 			
FY 2015 Plans:			
<ul style="list-style-type: none"> • Collect and analyze DoD lab metrics as defined in FY 2014 assessment. Determine significance of trends and develop corrective actions as needed. • Expand the function of the T2 Center of Excellence established in FY 2014. Collect and analyze metrics. • Conduct 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 DoD research and development enterprise in support of critical cross-Service technological needs. 			
FY 2016 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P796 / <i>Laboratory Resource Management</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> 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 identified 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. 			
Accomplishments/Planned Programs Subtotals	1.767	2.340	2.038

	FY 2014	FY 2015
Congressional Add: Defense Technology Transfer Program	-	10.000
FY 2015 Plans: Conduct 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>				Project (Number/Name) P797 / <i>Defense Technology Analysis</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P797: Defense Technology Analysis</i>	-	4.439	4.880	3.532	-	3.532	5.153	5.124	5.678	5.755	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 and 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, and management support, travel, and publications.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: DoD Technology Analysis	4.439	4.880	3.532
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 and ensures that the technology being developed is affordable and minimizes system development risk.			
FY 2014 Accomplishments: Provided engineering, scientific, analytical, and managerial support to the ODASD(R). Efforts included: <ul style="list-style-type: none"> • Congressional report - Counter Terrorism & Counter Insurgency; • Congressional report - Personal Protection Study & Strategy to Improve Body Armor; • Response to Deputy Secretary of Defense for implementation of the President's Executive Action for "Continuing our Commitment to Improve Treatments for Mental Health Conditions, Including PTSD"; • Workshop on cognitive sciences/autonomy; • Workshop on directed energy; • Analysis of techniques to passively detect, characterize, and localize low probability intercept signals; • Workshop and summary on limited, affordable, low-volume manufacturing; and, • Workshop and summary on big data in materials research and development. 			
FY 2015 Plans: Provide engineering, scientific, analytical, and managerial support to the ODASD(R) in: <ul style="list-style-type: none"> • Developing strategies, plans, and policies to develop and exploit technology; 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P797 / <i>Defense Technology Analysis</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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; and • Seeking opportunities for interdepartmental and international cooperation in high priority S&T. Conduct intradepartmental coordination to achieve goals as necessary. <p>FY 2016 Plans: Provide engineering, scientific, analytical, and managerial support to the ODASD(R) in:</p> <ul style="list-style-type: none"> • 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; and • Seeking opportunities for interdepartmental and international cooperation in high priority S&T. Conduct intradepartmental coordination to achieve goals as necessary. 				
Accomplishments/Planned Programs Subtotals		4.439	4.880	3.532
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.				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P798 / <i>Defense Support Teams</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
<i>P798: Defense Support Teams</i>	-	2.285	1.817	1.471	-	1.471	2.318	2.307	2.423	2.455	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 2014	FY 2015	FY 2016
Title: Defense Support Teams	2.285	1.817	1.471
<p>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.</p>			
<p>FY 2014 Accomplishments: Established support teams and conducted technology analyses to support R&E program investment decisions and recommendations. Efforts supported by the project included:</p> <ul style="list-style-type: none"> • Responses to Congress on matters pertaining to the use of live tissue training; • DoD input to the White House National Science and Technology Council - Task Force on Ebola Response S&T; and, • DoD input to the White House National Science and Technology Council - Common Rule Modernization Working Group. 			
<p>FY 2015 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.</p>			
<p>FY 2016 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P798 / <i>Defense Support Teams</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
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	2.285	1.817	1.471

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) program element. 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>				Project (Number/Name) P579 / <i>Critical Technology Assessments</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P579: <i>Critical Technology Assessments</i>	-	0.902	0.603	0.800	-	0.800	1.317	1.333	1.441	1.460	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 2014	FY 2015	FY 2016
Title: Critical Technology Assessments	0.902	0.603	0.800
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 2014 Accomplishments:			
- Maintained technical interface to export technology security organizations and functions.			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P579 / <i>Critical Technology Assessments</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Maintained interface with user community for critical technology assessments.			
<i>FY 2015 Plans:</i> - Maintain technical interface to export technology security organizations and functions. - Maintain interface with user community for critical technology assessments.			
<i>FY 2016 Plans:</i> - Maintain technical interface to export technology security organizations and functions. - Maintain interface with user community for critical technology assessments.			
Accomplishments/Planned Programs Subtotals	0.902	0.603	0.800

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

This effort was realigned from PE 0605110D8Z USD(A&T) Critical Technology Support to PE 0605798D8Z Defense Technology Analysis, P579 Critical Technology Assessments beginning in FY 2014.

D. Acquisition Strategy

N/A

E. Performance Metrics

- Currency of the user community of critical technology assessments.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>				Project (Number/Name) P102 / <i>Data Vulnerability Tiger Team</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P102: <i>Data Vulnerability Tiger Team</i>	-	-	2.434	6.119	-	6.119	12.565	13.654	14.594	14.711	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 2014	FY 2015	FY 2016
Title: Data Vulnerability Assessment and Analysis	-	2.434	6.119
Description: The Data Vulnerability Assessment and Analysis project will establish a joint analysis capability to conduct comprehensive assessments of controlled unclassified technical information losses, engaging acquisition and intelligence sources to determine consequences and appropriate preventative/mitigation actions.			
FY 2015 Plans: Prototype an initial joint analysis concept of operations, and provide support for one to three net loss assessment cases. Each case will consist of an integrated blue and red assessment of compromised controlled unclassified technical information with an end product that contains a comprehensive net assessment of technical data losses for each case. The net assessment will also determine the consequences of losses and implications to directly inform requirements, acquisition, programmatic, and strategic courses of action. Additional protection mechanisms will be provided to inform program protection planning activities for capabilities affected by this loss of information.			
FY 2016 Plans: Continue development of the joint analysis capability to support net loss assessment. Increase engagement with multiple components of the IC/CI communities to expand data access and protection efforts. The FY 2016 emphasis will be to			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605798D8Z / <i>Defense Technology Analysis</i>	Project (Number/Name) P102 / <i>Data Vulnerability Tiger Team</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
demonstrate the ability of the joint analysis capability to rapidly scale through development of a supporting analytic tool suite which enables responsiveness in compressed timeframes, development of dynamic links with applicable program protection plans, and delivery of actionable recommendations to appropriate decision makers. The integration of advanced analytic tools, coupled with identification of additional information feeds/sources of data, continue to further the analytic capability. Scaling the analytic capability via the tool suite will be accompanied with increased engagement with acquisition and intelligence expertise.			
Accomplishments/Planned Programs Subtotals	-	2.434	6.119

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

The Data Vulnerability Tiger Team (DVTT) metric is the number of completed cases.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	18.698	19.160	17.371	-	17.371	17.066	17.799	17.543	17.727	Continuing	Continuing
P804: <i>Development Test & Evaluation</i>	-	18.698	19.160	17.371	-	17.371	17.066	17.799	17.543	17.727	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	19.394	15.187	14.924	-	14.924
Current President's Budget	18.698	19.160	17.371	-	17.371
Total Adjustments	-0.696	3.973	2.447	-	2.447
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.009	-			
• SBIR/STTR Transfer	-0.687	-			
• Realignment for Higher Priority Programs	-	-	2.496	-	2.496
• FFRDC SEC 8104	-	-0.027	-	-	-
• Economic Assumptions	-	-	-0.049	-	-0.049

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>	

Change Summary Explanation

The "Realignment for Higher Priority" FY 2016 will provide additional FFRDC support, partially sustain the Scientific Test and Analysis Techniques Center of Excellence (STAT COE), and implement DT&E planning tools for all acquisition programs.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>				Project (Number/Name) P804 / <i>Development Test & Evaluation</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P804: <i>Development Test & Evaluation</i>	-	18.698	19.160	17.371	-	17.371	17.066	17.799	17.543	17.727	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 2014	FY 2015	FY 2016
Title: Developmental Test and Evaluation	18.698	19.160	17.371
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			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>	Project (Number/Name) P804 / <i>Development Test & Evaluation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> -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). -Implemented 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 increased the amount 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 TEMP's submitted to support major acquisition reviews for MDAPs. -Developed the DT&E Annual Report to Congress that provides an assessment of MDAP DT&E progress and assesses the T&E workforce. -Refined DT&E policies and methodologies addressing DT&E across all MDAP, MAIS and SI programs. In concert with DASD(SE), began development of a comprehensive system security engineering and test and evaluation approach to address system security and cybersecurity throughout the acquisition lifecycle. -Published DT&E data-based system performance assessments to support Defense Acquisition Board (DAB) review of MDAP and MAIS programs proceeding to major milestones. -Sustained the Scientific Test and Analysis Techniques Center of Excellence (STAT COE). -Promoted the application of sound DT&E and related technical disciplines across the Department's acquisition community and programs. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> -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 increase the amount 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>	Project (Number/Name) P804 / <i>Development Test & Evaluation</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> -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. -Develop the DT&E Annual Report to Congress that provides an assessment of MDAP DT&E progress and assesses the T&E workforce. -Refine DT&E policies and methodologies addressing DT&E across all MDAP, MAIS and SI programs. In concert with DASD(SE), publish a comprehensive system security engineering and test and evaluation process to address system security and cybersecurity throughout the acquisition lifecycle. -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. -Sustain the Scientific Test and Analysis Techniques Center of Excellence (STAT COE). <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> -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 increase the amount 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. -Develop the DT&E Annual Report to Congress that provides an assessment of MDAP DT&E progress and assesses the T&E workforce. -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. -Partially sustain the Scientific Test and Analysis Techniques Center of Excellence (STAT COE). 			
Accomplishments/Planned Programs Subtotals	18.698	19.160	17.371

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605804D8Z / <i>Development Test & Evaluation</i>	Project (Number/Name) P804 / <i>Development Test & Evaluation</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics <ul style="list-style-type: none">• 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.• Refined a DT&E cybersecurity strategy composed of four areas: process (policy and guidance), methodology (best test practices), workforce training, and infrastructure (enclosed and distributed ranges).• The Scientific Test and Analysis Techniques Center of Excellence (STAT COE) supported development of disciplined test strategies.• Planned and executed pilot events to focus on cybersecurity test infrastructure gaps and to examine different test methodologies.		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)											
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	PE 0606100D8Z I <i>Budget and Program Assessments</i>											
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	14.572	4.005	4.093	4.123	-	4.123	4.161	4.210	4.259	4.325	Continuing	Continuing
101: <i>Budget and Program Assessments</i>	14.572	4.005	4.093	4.123	-	4.123	4.161	4.210	4.259	4.325	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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	4.068	4.100	4.150	-	4.150
Current President's Budget	4.005	4.093	4.123	-	4.123
Total Adjustments	-0.063	-0.007	-0.027	-	-0.027
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.063	-			
• Economic Assumptions	-	-	-0.027	-	-0.027
• FFRDC	-	-0.007	-	-	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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*

Change Summary Explanation

Program reduced minimally to better align with Department priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
101: Budget and Program Assessments	14.572	4.005	4.093	4.123	-	4.123	4.161	4.210	4.259	4.325	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 2014	FY 2015	FY 2016
Title: OSD Support for Programming Budget	4.005	4.093	4.123
<p>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 the senior leadership's deliberations and decision-making.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - 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 AoAs to support major acquisition decisions; land forces, including the manning, equipping, training, sustaining, and fighting these forces with special emphasis on the resources needed to accomplish these activities. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606100D8Z / <i>Budget and Program Assessments</i>	Project (Number/Name) 101 / <i>Budget and Program Assessments</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 sea and airbase scenarios 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. - Continued to analyze alternative cyber defense strategies to improve the cyber security and mission assurance of the Department of Defense, by support of training objectives and scenarios and advocating for and assisting in the development of a data driven analysis. - Continued to analyze sexual assault investigations from Service Military Criminal Investigative Organizations to identify programs that can be developed or expanded to eliminate the problem. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - Continue to evaluate and upgrade the cost analysis tools used to inform program, budget, and Defense Acquisition Board reviews. - Continue to analyzed 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 fighting these forces with special emphasis on the resources needed to accomplish these activities. - 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. - Evaluate scenarios for reducing logistics vulnerabilities to include evaluation of threat databases, demographics, and technological trends; and developed strategies to reduce the impact on national security resources. - Analyze scenarios of national security interest to support transformation initiatives. - Improve 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. - Analyze alternative cyber defense strategies to improve the cyber security and mission assurance of the Department of Defense, by support of training objectives and scenarios and advocating for and assisting in the development of a data driven analysis. - Continue to analyze sexual assault investigations from Service Military Criminal Investigative Organizations to identify programs that can be developed or expanded to eliminate the problem. <p>FY 2016 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606100D8Z / <i>Budget and Program Assessments</i>	Project (Number/Name) 101 / <i>Budget and Program Assessments</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Studies, analyses, and assessments will be focused on:</p> <ul style="list-style-type: none"> - Improving cost analysis tools to inform program, budget, and Defense Acquisition Board reviews - In support of WSARA, independently assessing, analyzing, and, where appropriate, updating cost indices, inflation rates, and escalation rates used in preparation of the President’s budget for major acquisition programs. - Developing and enhancing databases that provide cost data for major weapon systems - Improving estimates produced by the Defense Employment and Purchases Projection System and Defense Translator, which are used in decision briefs to the President, Congress, Secretary of Defense, and Deputy Secretary of Defense. The translator accounts for the distribution of Defense spending among the industries producing the goods and services that support DoD. - Modeling and analysis of aircraft survivability against various threat detection approaches and in various operational environments. Assessing the ability of aircraft and weapons to operate in anti-access/area denial regions. - Modeling and analysis of logistical vulnerabilities against various threats and in various operational environments. Assessing the cost and mission effectiveness of proposed improvements. - Scenarios and modeling for mobile intelligence targets. - In support of the Defense Strategic Guidance, analyzing rotary wing programs to assess alternative platforms for combat rescue; examining the cost of all mission alternatives and acquisition strategies. 			
Accomplishments/Planned Programs Subtotals	4.005	4.093	4.123

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 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0203345D8Z / <i>Defense Operations Security Initiative</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	4.075	5.161	1.952	1.946	-	1.946	2.409	2.885	3.321	3.364	Continuing	Continuing
345: <i>Defense Operations Security Initiative</i>	4.075	5.161	1.952	1.946	-	1.946	2.409	2.885	3.321	3.364	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 DoD Operations Security capability and capacity across the Department of Defense. 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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	5.288	1.956	2.404	-	2.404
Current President's Budget	5.161	1.952	1.946	-	1.946
Total Adjustments	-0.127	-0.004	-0.458	-	-0.458
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.004			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.127	-			
• Baseline Program Adjustment	-	-	-0.453	-	-0.453
• Departmental Adjustment	-	-	-0.005	-	-0.005

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Operations Security Initiative (DOSI)	5.161	1.952	1.946
FY 2014 Accomplishments:			
- Researched, developed and tested signature suppression capabilities (electro-magnetic spectrum, physical and environmental emissions) to meet Combatant Commands and DoD Component requirements for a key U.S. weapon system.			
- Researched, developed and tested signature emitting technologies to field alongside key U.S. weapon systems to enhance survivability and degrade foreign intelligence and collection activities in support of Combatant Command and DoD Component requirements.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0203345D8Z / <i>Defense Operations Security Initiative</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- Examined and invested research and development in technologies and capabilities to support current and emerging measures and countermeasures for OPSEC requirements in concert with acquisition processes. FY 2015 Plans: - Continue to research, develop and test signature management and OPSEC technologies to support COCOM and/or DoD Component requirements. - Ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Components. - Research, develop, test and evaluate OPSEC capabilities to support National security challenges. FY 2016 Plans: - Continue to research, develop and test signature management and OPSEC technologies to support COCOM and/or DoD Component requirements. - Continue to 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.			
Accomplishments/Planned Programs Subtotals	5.161	1.952	1.946

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0203345D8Z O&M DW: <i>Defense Operations Security Initiative</i>	-	4.181	4.254	-	4.254	4.180	4.409	4.526	4.524	Continuing	Continuing

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

RDT&E Performance metrics are used to establish baseline and assess progress toward enhancement and increase of Operations Security (OPSEC) capabilities and capacities across the Department of Defense's assigned responsibilities. The following metrics are based on the ROI of RDT&E investments and provide assessment to meeting:

- 1) operational requirements for OPSEC capabilities, 2) technical requirements for successful engineering, and 3) programmatic requirements for sustaining RDT&E

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0203345D8Z / <i>Defense Operations Security Initiative</i>
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successes across the Department:

- Seventy percent of evaluations and tests on engineered prototypes and next generation capabilities address Combatant Command 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 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	-	-	0.971	-	0.971	1.005	1.059	1.125	1.140	Continuing	Continuing
891: Defense Military Deception Program	-	-	-	0.971	-	0.971	1.005	1.059	1.125	1.140	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 DoD Military Deception (MILDEC) capability and capacity across the Department of Defense. 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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	-	0.974	-	0.974
Current President's Budget	-	-	0.971	-	0.971
Total Adjustments	-	-	-0.003	-	-0.003
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-	-	-0.003	-	-0.003

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Military Deception Program Office (DMDPO)	-	-	0.971
FY 2016 Plans:			
- Continue to research, develop and test high-fidelity next generation decoys and capabilities to meet Combatant Commands and DoD Component MILDEC requirements.			
- Continue to develop technology feasibility reports on potential deception threats to U.S. systems.			
- Continue to ensure developed prototypes and capabilities transition into formalized program offices and program executive offices across DoD Components.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support	R-1 Program Element (Number/Name) PE 0303260D8Z I Defense Military Deception Program Office
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
- 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

D. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0303260D8Z O&M DW: Defense Military Deception Program Office	3.743	3.611	3.973	-	3.973	4.081	2.544	2.678	2.700	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 Department of Defense (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 Department of Defense's assigned responsibilities. The following metrics are based on the ROI 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 Combatant Command 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	PE 0303260D8Z / <i>Defense Military Deception Program Office</i>

- 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 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>					PE 0305193D8Z / <i>Cyber Intelligence</i>							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	50.629	7.586	6.738	6.579	-	6.579	6.723	6.992	7.427	7.528	Continuing	Continuing
001: <i>Cyber and Intelligence Operations Integration</i>	50.629	7.586	6.738	6.579	-	6.579	6.723	6.992	7.427	7.528	Continuing	Continuing

A. Mission Description and Budget Item Justification

- The program element encompasses those activities pertaining to operations support and intelligence integration, cyber technology innovation, intelligence and related activities in Cyberspace and strategic assessments.
- This program is a 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 this program is the rapid experimentation and development of existing technologies (hardware, software, databases, analytics, etc.) to create new cyber intelligence capabilities and demonstrate their value in support of operations.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	7.586	6.748	6.596	-	6.596
Current President's Budget	7.586	6.738	6.579	-	6.579
Total Adjustments	-	-0.010	-0.017	-	-0.017
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.010			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Departmental Adjustment	-	-	-0.017	-	-0.017

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0305193D8Z / <i>Cyber Intelligence</i>	Project (Number/Name) 001 / <i>Cyber and Intelligence Operations Integration</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
001: <i>Cyber and Intelligence Operations Integration</i>	50.629	7.586	6.738	6.579	-	6.579	6.723	6.992	7.427	7.528	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber and Intelligence Operations Integration Project will integrate intelligence activities in the information/collaborative environment and Cyberspace with conventional and asymmetric military operations. Further, they will provide new 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 2014	FY 2015	FY 2016
Title: Cyber and Intelligence Operations Integration (IOI)	7.586	6.738	6.579
FY 2014 Accomplishments: - Developed cyber and IOI capabilities and capacity to support COCOMs and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and IOI technologies that support warfighter needs.			
FY 2015 Plans: - Will develop cyber and IOI capabilities and capacity to support COCOMs and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and IOI technologies that support warfighter needs.			
FY 2016 Plans: - Continue to develop cyber and IOI capabilities and capacity to support COCOMs and Services to execute cyber and asymmetric operations activities to include critical and emerging cyber, cyber intelligence and IOI technologies that support warfighter needs.			
Accomplishments/Planned Programs Subtotals	7.586	6.738	6.579

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Cyber and IOI 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0305193D8Z / <i>Cyber Intelligence</i>	Project (Number/Name) 001 / <i>Cyber and Intelligence Operations Integration</i>

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 and fidelity 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 IOI Communities.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	119.364	38.245	38.950	43.811	-	43.811	43.914	43.492	43.486	44.074	Continuing	Continuing
758: Joint National Training Capability (JNTC)	63.547	18.977	22.948	31.808	-	31.808	32.816	32.116	32.107	32.581	Continuing	Continuing
761: Joint Simulations Systems (JSS)	10.225	3.036	2.193	2.324	-	2.324	1.406	1.408	1.409	1.423	Continuing	Continuing
769: Joint Knowledge Development & Distribution Capability (JKDDC)	9.031	3.950	4.000	3.984	-	3.984	3.989	4.087	4.088	4.129	Continuing	Continuing
770: U.S. Forces Korea Training and Exercise Support	24.050	5.997	4.483	-	-	-	-	-	-	-	-	34.530
701: Air Force Joint National Training Capability (JNTC)	4.996	2.189	2.716	2.783	-	2.783	2.787	2.855	2.855	2.884	Continuing	Continuing
772: Navy Joint National Training Capability (JNTC)	7.515	4.096	2.610	2.912	-	2.912	2.916	3.026	3.027	3.057	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 2015 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 SOF joint training and enabling capabilities that improve interoperability and realism of tactical and operational joint training between the Services and USSOCOM.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6: RDT&E Management Support</i>	PE 0804767D8Z I <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	38.909	44.005	43.084	-	43.084
Current President's Budget	38.245	38.950	43.811	-	43.811
Total Adjustments	-0.664	-5.055	0.727	-	0.727
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.016	-			
• SBIR/STTR Transfer	-0.648	-			
• FFRDC Reduction	-	-0.055	-	-	-
• Internal Program Realignment to O&M	-	-	-1.000	-	-1.000
• Baseline Program Reduction	-	-	-0.164	-	-0.164
• Economic Assumptions	-	-	-0.109	-	-0.109
• Joint Warfighting - Space	-	-	2.000	-	2.000

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
758: Joint National Training Capability (JNTC)	63.547	18.977	22.948	31.808	-	31.808	32.816	32.116	32.107	32.581	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 net funding increase in FY 2015 is planned growth to accelerate development of the cloud-enabled joint training environment. 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 2016, this investment expands 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 2014	FY 2015	FY 2016
Title: Joint National Training Capability (JNTC)	18.977	22.948	31.808
<p>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 (through web-based and cloud capabilities).</p> <p>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</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 758 / <i>Joint National Training Capability (JNTC)</i>

B. Accomplishments/Planned Programs (\$ in Millions)

supporting Combatant Command training requirements and CJCS High Interest Training Items identified in the Chairman's Annual Training Guidance.

FY 2014 Accomplishments:

- Established the Joint Training Enterprise Architecture (JTEA) (Blueprint). This blueprint enables the DoD training community to produce technical designs that adhere to standards, meeting DoD mandates for data center consolidation and technical alignment with the Joint Information Environment (JIE).
- Conducted successful JLVC 2020 modeling and simulation training capability integration events with the Services to prepare for limited operational capability in FY 2015.
- Continued to build JTE modeling and simulation, networking, and information technology applications into a cloud-enabled modular service supporting Combatant Command and Service joint training requirements.
- Demonstrated the Virtual Collective Training Environment (VCTE) in development. VCTE is a Virtual World Framework capability that provides a virtual collaboration space with linkages to real world systems that will allow for virtual interaction of training activity participants.
- Developed the Joint After Action Review-Resource Library (JAAR-RL), Version 3.1 capability. Provided a virtualized, web-enabled suite of enterprise after action review services supporting the Joint Training Enterprise Architecture (JTEA).
- Upgraded USAF Space simulation capabilities for Global Positioning Satellite and infrared sensor representations which adapted a capability to capture classified data into training/simulation capabilities.
- Developed a graphic user interface that assists migration of map datum in the U.S. National Global Spatial vector dataset supporting terrain development requirements for the USMC Marine Air Ground Task Force Tactical Warfare Simulation in support of Joint, Coalition and multi-Service training events.

FY 2015 Plans:

- In accordance with Deputy Assistant Secretary of Defense (Readiness) (DASD(R)) direction to "Advance Joint Training Environment to exist within a future JIE and Data Center Consolidation Initiative," continue 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.
- Conduct JLVC 2020 Integration Events with Services to prepare for limited operational capability release in CY 2015.
- Continue 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.

FY 2014	FY 2015	FY 2016

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> 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. Complete development of a 3-D immersive virtual environment to facilitate a distributed collaboration environment. Develop an amphibious scheduling service that provides U.S. Marine Corps doctrinally correct amphibious events/effects in support of training without USMC Subject Matter Experts present. Develop an unconventional warfare service that is intended to simulate Special Operations Forces (SOF) Unconventional Warfare at the Operational Level. This service is intended to be used for cases where the training audience is at the Combatant Commands, JTF, or SOF Component level. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> I AW DASD(R) direction to “enhance adaptivity by implementing innovative collective/individual training,” achieve JTE initial operating capability in FY 2016 in order 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. 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 automatically provide JTE services (i.e. data, simulation, planning tools, virtualize C2, etc.) through additional computing power/resources based on user demand. 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. 			
Accomplishments/Planned Programs Subtotals	18.977	22.948	31.808

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0804767D8Z: JNTC O&M Funding	29.037	25.732	36.341	-	36.341	35.880	35.865	35.308	34.328	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 758 / <i>Joint National Training Capability (JNTC)</i>

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:

- Provide external access and data usage from the Consolidated Data Center. (FY 2015)
- Conduct integration events with Services and gain enterprise consensus for publishable standards. (FY 2015)
- Set conditions for Service participation in model decomposition. (FY 2015)
- Service performs decomposition of legacy models and simulations. (FY 2016)
- Develop/deliver Amphibious Scheduling Service (FY 2015)
- Initiate/Develop individual staff section training (FY 2015)
- Increase the number of Order of Battle data sources accessible across the training network for search and download (FY 2015 and FY 2016)
- JLVC 2020 achieves Initial Operating Capability (FY 2016)
- Publish standards for developing JTE modular services (FY 2015/2016)
- Conduct at least one small Joint Command Post distributed training event from home station (FY 2016)

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
761: Joint Simulations Systems (JSS)	10.225	3.036	2.193	2.324	-	2.324	1.406	1.408	1.409	1.423	Continuing	Continuing
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. The decrease in funding from FY 2014 to FY 2015 represents the programmed plan to complete the cloud-enabled modular services (CEMS) development of decomposed/harvested capabilities of legacy simulations.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Joint Simulation System (JSS)	3.036	2.193	2.324
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Continued transition to JLVC 2020 by decomposing, harvesting, and re-using DoD investment in Joint simulations to develop cloud-enabled modular services (CEMS). • Delivered operating system and information assurance development for the Joint Theater Level Simulation (JTLS) & Joint Conflict and Tactical Simulation (JCATS) to enable continued use to meet COMBATANT COMMAND’s training requirements. • Provided design and development of web-based applications used as services in CEMS environment. • Began design and development of Tactical Electronic Intelligence (TAC ELINT) Service and Satellite (SAT) Service as part of the decomposition and harvesting from the legacy simulations. • Continued to provide low cost, small support footprint, web-enabled and/or deployable solutions critical to Combatant Command training programs. • Continued JLVC 2020 development of cloud-enabled modular services. <p>FY 2015 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Sustain 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. • Continue development of JCATS and JTLS to meet Combatant Command training requirement gaps during transition to Joint Training Modeling and Simulation Federation. • Provide design and development of web-based applications used as services in cloud-based modular services environment supporting. • Provide 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. • Develop the Unconventional Warfare Service. This service will simulate Special Operations Forces Unconventional Warfare at the Operational Level. • Complete development of TAC ELINT and SAT Services. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • 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. • Perform test and integration for new development work completed. 			
Accomplishments/Planned Programs Subtotals	3.036	2.193	2.324

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0804767D8Z: JSS O&M Funding	0.957	0.953	0.943	-	0.943	0.444	-	-	-	-	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?

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 761 / <i>Joint Simulations Systems (JSS)</i>
<ul style="list-style-type: none">• 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? <p>Measures:</p> <ul style="list-style-type: none">• 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.• Develop the following modular services: Air mission scheduling service, and Unconventional warfare service.		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
769: Joint Knowledge Development & Distribution Capability (JKDDC)	9.031	3.950	4.000	3.984	-	3.984	3.989	4.087	4.088	4.129	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 Items, 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:

- 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 prior to serving in their assigned Combined/Joint Task Force (C/JTF) billets.
- JKO mobile courseware training device development: This facilitates the global distribution of web-based joint training content on portable, hand-held platforms.
- JKO Learning Content Management System (LCMS): JKO LCMS development is required to host and deliver JKO courses and track/report students' completions more efficiently.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Joint Knowledge Development & Distribution Capability (JKDDC)	3.950	4.000	3.984
Description: Joint Knowledge Development & Distribution Capability (JKDDC) Joint Knowledge Online (JKO) technology initiatives principally include Small Group Scenario Trainer (SGST) desktop modeling and simulation based training, mobile courseware training devices, and the JKO Learning Content Management System (LCMS) application. JKO mobile courseware training device development facilitates the global distribution of web-based joint training content on portable, hand-held platforms for DoD personnel. The JKO LCMS development is required to host and deliver JKO courses and track/report students' completions more efficiently.			
FY 2014 Accomplishments:			
• Developed, tested, and delivered an update to the Small Group Scenario Trainer (SGST) desktop modeling and simulation based training application. Updated product derived from Combatant Command user feedback provided a more effective and			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 769 / <i>Joint Knowledge Development & Distribution Capability (JKDDC)</i>

B. Accomplishments/Planned Programs (\$ in Millions)

efficient training capability that was integrated within the JKO Learning Content Management System (LCMS). This update improved the OSD endorsed Blended Learning Training component of Combatant Command collective training exercises.

- Assessed, refined, and continued implementing JKO’s comprehensive plan to develop mobile training device capabilities focused on JKO’s entire Joint Individual Training Toolkit. Planned components included existing JKO courseware conversion to hand-held devices, emerging FY 2014 training courseware requirements, and the leveraging of other DoD agencies, interagency, and multinational training courseware ported to mobile training devices.
- Developed, tested and delivered three JKO Learning Content Management System (LCMS) releases resulting in a more effective and efficient online training delivery and management application that is interoperable with DoD personnel management systems. Requirements were derived from Combatant Command user feedback and DoD training priorities. These enhancements facilitated approximately 30,000 daily log-ins and approximately 110,000 course completions per month by DoD personnel.

FY 2015 Plans:

- Assess, refine, and continue executing JKO’s comprehensive plan to develop mobile training device capabilities focused on JKO’s entire Joint Individual Training Toolkit. Plan components include existing JKO courseware conversion to portable, hand-held devices, emerging FY 2015 training courseware requirements, and the leveraging of other DoD agencies, interagency, and multinational training courseware ported to mobile training devices.
- Develop, test and deliver three 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.
- 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). The SGST will be used to prepare individuals serving in approximately six Combatant Command collective training exercises.

FY 2016 Plans:

- Assess, refine, and continue executing JKO’s comprehensive plan to develop mobile training device capabilities focused on JKO’s entire Joint Individual Training Toolkit. 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.
- Develop, test and deliver three JKO Learning Content Management System (LCMS) releases. Requirements will be derived from Combatant Command 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 and 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 current approximately 30,000 daily log-ins and approximately 110,000 course completions per month by DoD personnel.

FY 2014	FY 2015	FY 2016

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 769 / <i>Joint Knowledge Development & Distribution Capability (JKDDC)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
• 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).			
Accomplishments/Planned Programs Subtotals	3.950	4.000	3.984

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0804767D8Z: <i>JKDDC O&M Funding</i>	6.937	6.031	6.038	-	6.038	5.928	6.030	5.774	5.774	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.
- Provide a systematic, steady-state process for integrating cultural context, small group training, and intelligent remediation requirements into the Joint Training System.
- 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
770: U.S. Forces Korea Training and Exercise Support	24.050	5.997	4.483	-	-	-	-	-	-	-	-	34.530
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 JLVC 2020 simulations. FY 2015 is the last year for dedicated funding within the overall program.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: USFK Training & Exercise	5.997	4.483	-
<p>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 JLVC 2020 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Enhanced Army, Air Force, Navy, and Marine Corps Live, Virtual, and Constructive capabilities and fully integrated these into the JLVC 2020 modeling and simulation capability to meet USFK theater specific, Combatant Command, Service, and coalition training requirements. • Achieved interoperability of joint service and ROK modeling and simulations, capable of supporting large (e.g. > 1 million entities), high-intensity combat scenarios. Efforts allow for near seamless connection between JLVC Federation and Korean peninsula simulations, allowing for cross-model combat emulation interaction. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Documented the future “to be” Joint Training Environment in the DoD Architecture Framework (DoDAF) artifacts. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Continue to enhance Army, Air Force, Navy, and Marine Corps Live, Virtual, and Constructive capabilities and fully integrate these into the JLVC 2020 modeling and simulation capability to meet USFK theater specific, Combatant Command, Service, and Coalition training requirements. Invest in technology necessary to address Korean/U.S. modeling and simulation interoperability challenges and joint training requirements on Peninsula. Efforts are intended to support Joint/Service modeling and simulation with ROK modeling and simulation capable of supporting large (e.g. > 1 million entities), high-intensity combat scenarios under a single integrating architecture for Joint Training. 			
Accomplishments/Planned Programs Subtotals	5.997	4.483	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0804767D8Z: U.S. Forces Korea Training & Exercise Proc	0.309	0.299	-	-	-	-	-	-	-	-	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:

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 770 / <i>U.S. Forces Korea Training and Exercise Support</i>
<ul style="list-style-type: none">• 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.		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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)
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
701: Air Force Joint National Training Capability (JNTC)	4.996	2.189	2.716	2.783	-	2.783	2.787	2.855	2.855	2.884	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 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

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Air Force Joint National Training Capability (JNTC)	2.189	2.716	2.783
<p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Cyber Simulation: Developed a Live, Virtual, and Constructive(LVC) cyber simulator to train tactical cyber operators in offensive and defensive operations. Modeled cyber effects on adversary networks for presenting the cyber effects for the conventional force through the Air and Space Collaborative Environment Information Operations Suite (ACE-IOS). • Joint Cross Domain Information Sharing (CDIS) Enterprise Network Architecture: Participated in a cooperative project of USAF/ US Navy Research 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. • Air and Space Collaborative Environment Information Operations Suite (ACE-IOS) - Developed the ACE-IOS to incorporate interfaces to C2 systems. Created a seamless integrated environment to exploit Services simulations to support joint training regardless of the federation it currently resides. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 701 / <i>Air Force Joint National Training Capability (JNTC)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> 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. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> Cyber Simulation: Continue improving a LVC Cyber Simulator to train tactical cyber operators in offensive and defensive operations. Continue modeling cyber effects on adversary networks for presenting the cyber effects for conventional forces through the ACE-IOS. Joint CDIS Enterprise Network Architecture: Continue 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: Migrate the ACE-IOS to meet the new standards being developed for JLVC 2020. Improve the efficiency of the ACE-IOS through performance enhancing techniques and improved data generation capabilities. Simulation Integration: Integrate the mission training simulators for the Predator/Reaper Unmanned Aerial System platforms into the Distributed Mission Operation federation of simulators. Space Simulations: Improved Space simulation capabilities in the GPS and infrared sensor representations in the ACE-IOS. Enhance the capability to incorporate top secret data into the simulation capabilities. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> Space and Cyber Simulation: Continue to develop the cyber capabilities and migrate these capabilities to the JLVC 2020 standards. ACE-IOS: Continue to migrate the capabilities to the JLVC standards. 			
Accomplishments/Planned Programs Subtotals	2.189	2.716	2.783

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0804767D8Z: <i>Air Force JNTC O&M Funding</i>	18.194	12.043	10.514	-	10.514	10.274	10.358	10.299	10.299	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 701 / <i>Air Force Joint National Training Capability (JNTC)</i>

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
772: Navy Joint National Training Capability (JNTC)	7.515	4.096	2.610	2.912	-	2.912	2.916	3.026	3.027	3.057	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 2014	FY 2015	FY 2016
Title: Navy Joint National Training Capability (JNTC)	4.096	2.610	2.912
<p>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 technologies 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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Aligned Navy LVC training standards with JLVC training standards, particularly next generation JLVC and Joint Training Enterprise Architectures. • Developed ballistic missile defense (BMD) training capabilities (including “Aegis Ashore”) to train and certify all personnel deploying for the President’s mandate to provide regional missile defense for Europe and numerous EUCOM/CENTCOM BMD models. • Integrated new cyber and information operations training systems, including the STALLION Information Operations trainer and unmanned aircraft systems (UAS) streaming video generation and distribution systems. • Integrated additional Coalition Partner nation capabilities including Japanese PATRIOT and Air Defense Ground Environment. • Extended and integrated virtual and augmented reality into training to facilitate the mastery of tasks not easily addressed in live training. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Continue alignment of Navy LVC training standards with JLVC training standards. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Reduce and limit development of BMD training capabilities due to 40% reduction in resourcing baseline. Efforts to integrate Aegis Ashore and upgrade EUCOM/CENTCOM BMD models will be minimal. Reduce efforts related to integration of additional Coalition Partner nation capabilities due to resourcing constraints. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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 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	4.096	2.610	2.912

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0804767D8Z: Navy JNTC O&M Funding	7.607	6.992	7.877	-	7.877	7.876	7.917	7.881	7.881	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?
- 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?

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0804767D8Z / <i>COCOM Exercise Engagement and Training Transformation (CE2T2)</i>	Project (Number/Name) 772 / <i>Navy Joint National Training Capability (JNTC)</i>
<ul style="list-style-type: none">• 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.		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	2.463	0.941	-	-	-	-	-	-	-	-	Continuing	Continuing
546: Financing for Cancelled Account Adjustments	2.463	0.941	-	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RDT&E Management Support

B. Program Change Summary (\$ in Millions)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	0.941	-	-	-	-
Total Adjustments	0.941	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.941	-			
• SBIR/STTR Transfer	-	-			

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Not applicable for this item.	0.941	-	-
FY 2014 Accomplishments: RDT&E Management Support			
Accomplishments/Planned Programs Subtotals			
	0.941	-	-

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	PE 0909999D8Z / <i>Financing for Cancelled Account Adjustments</i>

F. Performance Metrics

Not applicable for this item.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607210D8Z I <i>Industrial Base Analysis and Sustainment Support</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	9.638	14.756	22.576	-	22.576	16.705	11.119	5.664	5.741	Continuing	Continuing
819: <i>Industrial Base Analysis and Sustainment</i>	0.000	9.638	14.756	22.576	-	22.576	16.705	11.119	5.664	5.741	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$2.207M to account for the availability of prior year execution balances.

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 support the monitoring and assessment of the industrial base, address critical issues in the industrial base relating to urgent operational needs, support efforts to expand the industrial base and address supply chain vulnerabilities. This program maintains or improves the health of critical and fragile defense industry capabilities that are at risk of being lost but are needed at present and/or have verified future requirements in support of the National Defense Strategy. The goal of the program is to avoid loss of critical capabilities and resultant reconstitution costs, where affordable and innovative mechanisms are available to the producers in the interim.

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 (< 5 years); 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	9.993	14.778	17.896	-	17.896
Current President's Budget	9.638	14.756	22.576	-	22.576
Total Adjustments	-0.355	-0.022	4.680	-	4.680
• Congressional General Reductions	-	-0.022			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.005	-			
• SBIR/STTR Transfer	-0.350	-			
• Program Baseline Adjustment	-	-	-2.276	-	-2.276

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607210D8Z I <i>Industrial Base Analysis and Sustainment Support</i>
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• Economic Adjustment	-	-	-0.044	-	-0.044
• Space Industrial Base Sector	-	-	7.000	-	7.000

Change Summary Explanation

FY 2016 baseline program increased with Department priorities.

The \$4.680M increase from FY2015 to FY2016 is an increase for Space Sector Sustainment. The funding is targeted to maintain active Mercury-Cadmium-Telluride (MCT) detector production (and the capability to surge) to meet the needs of National Security Systems in the Missile and Space Sectors. This MCT project leverages Defense Manufacturing Science and Technology (DMST) work to qualify MCT projects.

The FY 2016 funding request was reduced by \$2.207M to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>				Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
819: <i>Industrial Base Analysis and Sustainment</i>	-	9.638	14.756	22.576	-	22.576	16.705	11.119	5.664	5.741	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

OSD Acquisition, Technology and Logistics (AT&L) investments under this program are informed by the Department's Sector by Sector, Tier by Tier (S2T2) program for industrial base analysis directed by Title 10 Section 2503 and carried out by the Deputy Assistant Secretary of Defense (Manufacturing and Industrial Base Policy) (DASD (MIBP)). Periodic S2T2 assessments under this program, directed by Title 10 Section 2505, and other assessments collaboratively identify elements of the industrial base where current acquisition programs will not invest enough in production and/or research to support the minimum sustaining rate that would keep critical capabilities viable. While industrial base risks identified through these assessment tools are to be mitigated primarily through direct engagement with military departments, agencies, and industry, exceptional cases will require defense-wide intervention via investment accounts, often in collaboration with multiple Services and agencies, to ensure adequate industrial capability to support future defense needs.

This funding is a key tool for addressing supply chain risks and diminishing manufacturing sources. Investments are prioritized through a careful analysis at every tier of the supply chain according to a numerical scale of the risk-area's fragility and criticality. Fragility examines characteristics that make a specific product or service likely to be disrupted; criticality examines characteristics that make a specific product or service difficult to replace if disrupted. These concepts underpin AT&L's core mission and inform critical investment, budgetary, and programmatic decision-making.

S2T2 fragility and criticality assessments are applied across the DoD enterprise to identify and prioritize industrial base niches requiring additional investment by DoD. The purpose of investment is to sustain essential industrial production and design team capabilities. Projects will focus on high impact industrial base sectors with a combination of defense-specific requirements and low, limited or declining production. The focus areas are 1) missiles and munitions, 2) space, and 3) other defense-specific capabilities.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Missile and Munitions Industrial Base Sustainment	5.090	6.478	11.340
Description: With a decline in the procurement of missile programs, design and production skills for critical components within the missile sector industrial base are at risk, which could result in costly delays and unanticipated expense. The loss of this design and production capability could have a significant impact on many current and future missile programs, damaging the readiness and availability of technology. The missile sector sustainment effort will improve the existing production process efficiencies, explore advanced materials for higher performance, and upgrade outdated technology for missile components.			
FY 2014 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Addressed supply chain vulnerabilities and identified early indicators of program risk and made corrective and innovative investments in essential defense supply chains.</p> <p>Butanetriol (BT): This project developed a qualified domestic source for BT, a solid rocket fuel precursor chemical, precluding the necessity of procurement from a prohibited foreign source. Since 2008, DoD's projected requirements have shrunk to levels that substantially change the business case for development of new domestic source. To re-enable the business case and develop a permanent domestic industrial base, DoD funded a project to close the gap between the new and old business cases.</p> <p>Advanced Solid Rocket Propulsion: To support future missile interceptor missions, advanced kill vehicle thrusters for high precision and long duration missions are required. This is a defense-unique industrial base niche. In order to maintain this capability and avoid the loss of skills and intellectual capital, the Department is currently executing a project to develop high precision attitude control.</p> <p>FY 2015 Plans: Fragility and Criticality Assessments evaluated the impacts to the missile industrial base caused by declining procurements. Specific action is necessary to preserve industrial base capabilities for fuzes and thermal batteries.</p> <p>Fuzes: Business case analysis has found production for Electronic Arm and Safe Device (EASD) fuzes to be very fragile. To mitigate this risk the business case is being improved by expanding the use of EASD fuzes to multiple missiles. Project funding will be used to perform the work necessary to enable the fuze to be used on additional missiles.</p> <p>Another project will preserve the manufacturing capability for Low Energy Exploding Foil Initiators (LEEFI) used in a variety of DoD missile programs in anticipation of shutdown by the U. S. supplier.</p> <p>Thermal Batteries: Because of declining production for missiles, the demand for thermal batteries is also declining and production is falling below minimum sustaining rates. Project funding will be used to lower minimum sustaining rates to match demand by developing production improvements, improved technologies, and cost efficiencies.</p> <p>FY 2016 Plans: Address supply chain vulnerabilities and early indicators of program risk and make corrective and innovative investments in essential defense supply chains.</p> <p>Fragility and Criticality Assessments have assessed the impacts to the missile industrial base caused by declining procurements. Specific action is necessary to preserve industrial base capabilities for fuzes and thermal batteries. Projects will be executed to</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>improve the efficiency of existing production processes, explore advanced materials for higher performance and upgrade outdated technology.</p> <p>DoD will conduct additional industrial base assessments in FY 2016 to identify weaknesses and fragile and critical capabilities for FY 2017 project development. A call for FY 2016 projects has also been sent to the Service's Acquisition Executives (SAE's) requesting that proposals rate the fragility and criticality of subject capabilities. 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.</p>				
<p>Title: Space Industrial Base Sustainment</p> <p>Description: Investment in key sub-tier suppliers across the FYDP (FY16-20) will ensure qualified suppliers exist to support future system development efforts.</p> <p>FY 2014 Accomplishments: Joint efforts with other DoD, Department of Energy (DoE), and the National Reconnaissance Office (NRO) to maintain industrial base facilities that are capable of testing radiation hardened electronics. This funding provided resources to cover a one-time FY 2014 funding gap.</p> <p>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. Funding will be used to perform final space qualification work and avoid the much higher cost of developing replacement products with an alternative supplier.</p> <p>FY 2015 Plans: The project to perform space qualification of radiation hardened products will continue.</p> <p>Additional funding is targeted for another project to keep Mercury-Cadium-Telluride (MCT) detector production active (and capable of meeting surge requirements projected) for National Security Systems in the Space Sector. This MCT project leverages Defense Manufacturing Science and Technology (DMST) work to qualify MCT projects.</p> <p>FY 2016 Plans:</p>		2.092	3.638	7.001

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
<p>Twelve space industrial base capability areas have been identified as needing mitigation in FY16-20, half of them in the area of radiation-hardened electronics. IBAS funds for 2016 in this industrial base sector will focus on sustainment of existing capability. The 2015 project to keep MCT detector production active and capable of surging will be continued in 2016.</p> <p>Title: Other Defense-Specific Capabilities</p> <p>Description: With an overall decline in defense budgets, the industrial base sectors and niches hit hardest are those with a combination of defense-specific requirements and low, limited or declining production.</p> <p>FY 2014 Accomplishments: The Infrared Focal Plan Array (IRFPA) project focused on sustaining a continuous production capability for the Improved Forward Looking Infrared (I-FLIR) modernization program. It was identified as very high risk in a comprehensive assessment of the ground vehicle sector. There is a gap between the end of horizontal integration of FLIR and the slated start of I-FLIR modernization. In order to bridge the gap, the Department continues to maintain the foundry capability and intellectual base of critical suppliers through time-phased lots of IRFPAs.</p> <p>FY 2015 Plans: A variety of products have been identified as at risk because of their highly specialized nature and very low production.</p> <p>Funding is planned to bridge the gap between rapid prototype and formal DoD production for the Counter Bomber automated, standoff, suicide vest and concealed weapon detection sensor. The Counter Bomber detection sensor supports a variety of U. S. military operations.</p> <p>Another project will preserve the unique capability to manufacture Electromechanical Actuators needed to replace the hydraulics for aircraft carrier weapons and stores elevator systems. This capability is at risk because of a break in production.</p> <p>FY 2016 Plans: DoD will conduct additional industrial base assessments in FY 2015 to identify weaknesses and fragile and critical capabilities for FY 2016 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.</p>		2.456	4.640	4.235
Accomplishments/Planned Programs Subtotals		9.638	14.756	22.576
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>
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D. Acquisition Strategy

N/A

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 soon

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>
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IBAS Project Plan							
	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020
FY14 Project Execution							
FY15 Project Execution							
FY16 Project Execution							
FY17 Project Execution							
FY18 Project Execution							
FY19 Project Execution							

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607210D8Z / <i>Industrial Base Analysis and Sustainment Support</i>	Project (Number/Name) 819 / <i>Industrial Base Analysis and Sustainment</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 Project Execution	3	2014	4	2015
FY 15 Project Execution	1	2015	4	2016
FY 16 Project Execution	1	2016	4	2017
FY 17 Project Execution	1	2017	4	2018
FY 18 Project Execution	1	2018	4	2019
FY 19 Project Execution	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607310D8Z / <i>CWMD Systems: Operational Systems Development</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	1.872	2.948	1.901	-	1.901	5.926	6.695	6.877	6.971	Continuing	Continuing
P242: <i>Operational System Development</i>	0.000	1.872	2.948	1.901	-	1.901	5.926	6.695	6.877	6.971	Continuing	Continuing

Note

The FY 2016 funding request was reduced by \$2.030 million to account for 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, deploying, operating, and maintaining 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 foster a shared understanding of the CWMD operating environment and support decision making for operations and activities 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 small 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, 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, the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance, and capability requirements approved by the Joint Requirements Oversight Council. 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, 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 RDT&E program elements (0303310D8Z for research, development, testing and evaluation 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) line (ORC 2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0607310D8Z I <i>CWMD Systems: Operational Systems Development</i>
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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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	1.944	2.953	3.951	-	3.951
Current President's Budget	1.872	2.948	1.901	-	1.901
Total Adjustments	-0.072	-0.005	-2.050	-	-2.050
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.072	-			
• Baseline Adjustment	-	-	-0.015	-	-0.015
• FFRDC Sec 8104	-	-0.005	-	-	-
• Adjust baseline to align with delayed contract awards in FY14/15	-	-	-2.035	-	-2.035

Change Summary Explanation

FY16/17/18 program adjusted to align with contract awards delayed in FY14/15.

The FY 2016 funding request was reduced by \$2.030 million to account for prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: <i>Operational Systems Development</i>				Project (Number/Name) P242 / <i>Operational System Development</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
P242: <i>Operational System Development</i>	-	1.872	2.948	1.901	-	1.901	5.926	6.695	6.877	6.971	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Countering Weapons of Mass Destruction (CWMD) Systems program is researching, developing, integrating, testing, deploying, operating, and maintaining 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 foster a shared understanding of the CWMD operating environment and support decision making for operations and activities 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 small 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, 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, the Department of Defense (DoD) Strategy for Countering WMD, the FY2016-2020 Defense Planning Guidance, and capability requirements approved by the Joint Requirements Oversight Council. 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, 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 RDT&E program elements (0303310D8Z for research, development, testing and evaluation 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) line (ORC 2531) for program sustainment and administrative costs associated with analyses, oversight, and portfolio management.

This Program Element can fund travel to support the requirements of this program.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: <i>Operational Systems Development</i>	Project (Number/Name) P242 / <i>Operational System Development</i>
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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 2014	FY 2015	FY 2016
<p>Title: Operational Systems Upgrade and Improvement</p> <p>Description: • Upgrade and improve fielded systems to locate, gather, fuse, share, and visualize WMD and CWMD information, and facilitate collaboration and well-integrated decision making.</p> <ul style="list-style-type: none"> • Address the prioritized capabilities required of existing platforms to augment, upgrade and enhance core CWMD capabilities. • Provide upgrades and enhancements to previous capability package deliveries providing continuity and compatibility across the systems. <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> • Enhanced capabilities demonstrated in pre-prototype system and demonstrated capability prototype integrating materiel and non-materiel components. • Made Constellation system architecture compatible with the Joint Information Environment (JIE) and Intelligence Community Information Technology Enterprise (IC-ITE) frameworks. • Engineered Constellation platform to function at all levels of classification with ability to share information among and between classification domains. • Increased range of data types that can be accessed through Constellation, via data sharing and cooperative agreements with partners across the U.S. Government. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> • Upgrade and enhanced capability packages of operational prototype. • Achieve and demonstrated initial operational capability of integrated materiel and non-materiel CWMD situational awareness solutions. • Support semi-annual collection, validation, and prioritization of capability requirements for updated and new system capabilities. • Update and integrated infrastructure and systems required for personnel in units that operate Constellation, that provide reachback support, and support ongoing development of data and applications capabilities. • Continue to build/upgrade/modify the required infrastructure, including hardware and software for computational and processing capabilities, training, and organizational support. • Scale hardware to support additional users; integrated and tested analytical engine updates. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> • Continue to upgrade and enhance capability packages. 	1.872	2.948	1.901

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: Operational Systems Development	Project (Number/Name) P242 / Operational System Development

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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 personnel in units that operate Constellation that provide reachback support, and supply feedback to support ongoing development of data and applications capabilities. • Build/upgrade/modify the infrastructure, including hardware and software for computational and processing capabilities, training, and organizational support. • Scale hardware to support additional users. • Integrate and test analytical engine updates. 			
Accomplishments/Planned Programs Subtotals	1.872	2.948	1.901

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Utilize a knowledge based approach to achieve an operational capability with packages that provided upgraded CWMD situational awareness capabilities, with deliveries every six months, utilizing agile software development processes.

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 ASD/NCB. Maintain cost, schedule, and performance reporting, review, and adjudication. Maintain requirements traceability matrix.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: Operational Systems Development	Project (Number/Name) P242 / Operational System Development
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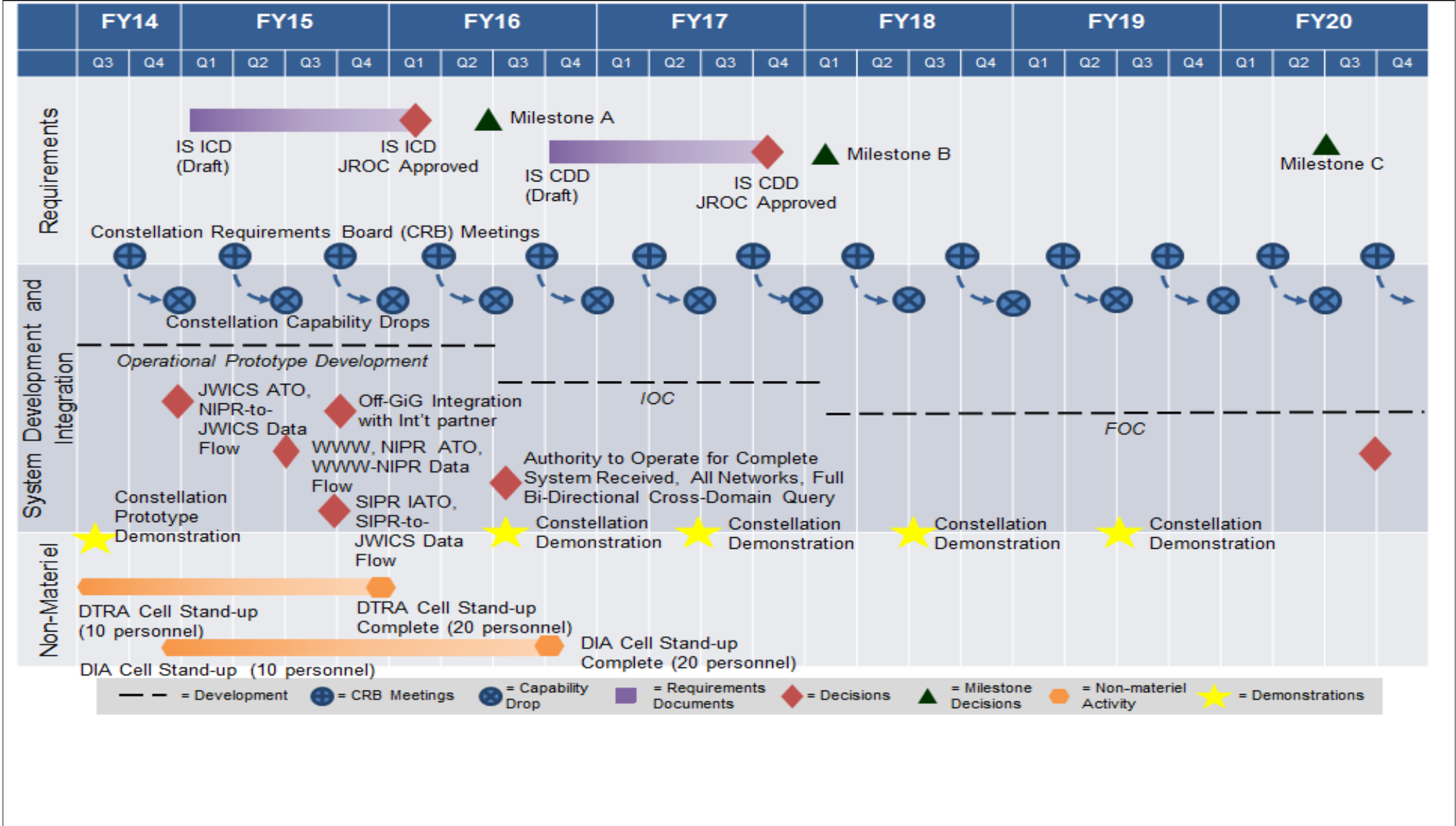
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	TBD	VAR - Various : TBD	0.000	1.872		2.948		0.950		-		0.950	Continuing	Continuing	-
Test and Evaluation	Various	Support Cells : DTRA and DIA	-	-		-		0.651		-		0.651	Continuing	Continuing	-
Management Services	FFRDC	MITRE : MA & VA	-	-		-		0.300		-		0.300	Continuing	Continuing	-
Subtotal			0.000	1.872		2.948		1.901		-		1.901	-	-	-
Project Cost Totals			0.000	1.872		2.948		1.901		-		1.901	-	-	-

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: Operational Systems Development	Project (Number/Name) P242 / Operational System Development
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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: Operational Systems Development	Project (Number/Name) P242 / Operational System Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Milestones				
Milestone A	3	2015	3	2015
Milestone B	1	2018	1	2018
Milestone C	2	2020	2	2020
Transition to Service or Agency	3	2020	3	2020
Requirements				
Develop Information System (IS) Initial Capabilities Document (IS ICD)	1	2015	2	2015
Requirements Definition Package (RDP) #1	2	2015	4	2015
RDP #2	3	2015	3	2016
RDP #3	3	2016	3	2017
Constellation Capability Drops				
Constellation Requirements Board (CRB) 1	2	2015	3	2015
CRB 2	4	2015	1	2016
CRB 3	2	2016	3	2016
CRB 4	4	2016	1	2017
CRB 5	2	2017	3	2017
CRB 6	4	2017	1	2018
CRB 7	2	2018	3	2018
CRD 8	4	2018	1	2019
CRB 9	2	2019	3	2019
CRB 10	4	2019	1	2020
CRB 11	2	2020	3	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0607310D8Z / CWMD Systems: Operational Systems Development	Project (Number/Name) P242 / Operational System Development
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
System Development & Integration				
Operational Prototype Development	1	2014	2	2017
Initial Operational Capability (IOC)	2	2017	4	2018
Full Operational Capability (FOC)	1	2019	4	2020
JWICS Authority To Operate (ATO), NIPR-to-JWICS Data Flow	4	2014	4	2014
WWW, NIPR ATO, WWW-to-NIPR Data Flow	3	2015	3	2015
Off-Global Information Grid (GIG) Integration with international partner	4	2015	4	2015
SIPR Interim ATO (IATO), SIPR-to-JWICS Data Flow	3	2015	3	2015
ATO for complete system, All networks, Full bi-directional cross-domain query	3	2016	3	2016
Demonstrations				
Constellation Prototype Demonstration	3	2014	3	2014
Constellation Demonstration (1)	3	2016	3	2016
Constellation Demonstration (2) (updated with spirals)	2	2017	2	2017
Constellation Demonstration (3) (updated with spirals)	3	2018	3	2018
Constellation Demonstration (4) (updated with spirals)	3	2019	3	2019
Non-Materiel				
DTRA cell stand-up	1	2014	4	2015
DTRA cell complete (20 personnel)	4	2015	4	2015
DIA cell stand-up	4	2014	4	2016
DIA cell complete (20 personnel)	4	2016	4	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140D8Z I <i>Information Systems Security Program</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	10.313	11.288	8.957	-	8.957	9.148	9.658	10.261	10.400	Continuing	Continuing
140: <i>Information Systems Security Program</i>	-	10.313	11.288	8.957	-	8.957	9.148	9.658	10.261	10.400	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 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. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	10.638	11.304	10.127	-	10.127
Current President's Budget	10.313	11.288	8.957	-	8.957
Total Adjustments	-0.325	-0.016	-1.170	-	-1.170
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.321	-			
• Program Adjustment	-0.004	-	-1.146	-	-1.146
• FFRDC Reduction	-	-0.016	-	-	-
• Economic Assumption	-	-	-0.024	-	-0.024

Change Summary Explanation

FY 2014: SBIR/STTR reduction -0.321 million, Program Adjustment -0.004 million.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	
FY 2015: FFRDC Reduction -0.016 million. FY 2016: Economic Assumption -0.024, Program Adjustment -1.146 million.		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>				Project (Number/Name) 140 / <i>Information Systems Security Program</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
140: <i>Information Systems Security Program</i>	-	10.313	11.288	8.957	-	8.957	9.148	9.658	10.261	10.400	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 2014	FY 2015	FY 2016
Title: Information Systems Security Program Plans and Accomplishments	10.313	11.288	8.957
FY 2014 Accomplishments:			
Supported development of the architecture and engineering elements of Joint Information Environment (JIE) and Joint Regional Security Stacks (JRSS) security requirements for the DoD.			
<ul style="list-style-type: none"> • Developed concepts and capabilities towards a comprehensive cybersecurity awareness and protection program, to support more consistent protection from supply chain exploitation and attack within/by individual procurements of materiel and services on which the DoD systems, networks, and missions depend. • Performed research and analyses regarding the development of standards and associated Supply Chain Risk Management (SCRM) protection methods -- with respect to people-process-technology-metrics for SCRM, Hardware, Software, and a Lifecycle Cybersecurity Risk Management administration. • Developed and initiated a 5-week iCollege SCRM elective course at the National Def. University. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • Along with OUSD AT&L, developed a proof-of-concept Adversary Threat Model that purposes to inform the DoD's Risk Management Framework (RMF) to address cybersecurity in complex systems acquired by the US Government. This Adversary Threat Model will inform the RMF and the Program Protection Plans, and aims to improve cybersecurity in the design and development of acquisition program test plans. • Supported developing the capability of assessing of potential cyber threats to major weapon systems and tactical communication systems, to include the identification of gaps and requirements for better understanding of advanced threats in the acquisition and integration of commercial and customized technologies into critical systems, and development of proposed courses of action and countermeasures. • Developed draft DoD security control and assessment guidance and procedures in support of NIST special publications to better enable certification and accreditation reciprocity, standardized testing, and compliance validation across the DoD. • Continued to evolve and refine the DoD Cloud and Mobile Device Strategy and Roadmap, to include policy and IA capabilities, necessary to support "end-to-end" IA capability for the Joint Information Environment (JIE), and for mobile enterprise services such as discovery, collaboration, messaging, mediation, data tagging, and other services. • Conduct Cyber Security program reviews with mission partners to address program implementation, resourcing issues, and requirements definition and refinement. • Developed, coordinated, and maintained Cyber metrics for reporting to DoD-CIO, DCMO and other organizations as necessary. • Developed various policy directives, instructions, and guidance documents on cybersecurity workforce, cross domain, network defense, and integrating cybersecurity throughout the acquisition life-cycle. • Initiated a more robust acquisition oversight process via updated acquisition policies/guidance to reflect integrated life-cycle cybersecurity risk management concepts and the on-going implementation of supply-chain-risk-management key practices and test and evaluation processes across DoD. • Supported development of the architecture and engineering of cloud computing and core data center security requirements for DoD, and synchronized Cloud security processes across DoD, and with other mission partners, and developed an initial command-and-control process model for commercial cloud implementation in coordination with other Fed Agencies. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Supported development of a charter document as part of a strategic plan for information security and continuous monitoring of DoD networks and systems. Developed a plan to effectively implement and integration recommendations of existing computer network defense, public-key-infrastructure, and related initiatives applicable to migrating to a Joint Information Environment (JIE). <p>FY 2015 Plans: 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.</p> <ul style="list-style-type: none"> Develop and implement strategies for successful defenses and operations in the event of sophisticated cyber adversaries and large-scale cyber incidents. Develop, refine, and implement a Joint Information Environment single security architecture strategy, and the related strategic metrics and enhanced analytical capabilities. Conduct 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. Support development and implementation of a more robust governance mechanism to minimize supply chain risks across the DoD components and activities. Develop an overarching international standard, or an improved integrated family of existing standards, for improving supply-chain-risk-management. 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> • 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. • Develop, publish, and refine DoD 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. • Continue oversight of the policies and capabilities to support comprehensive cybersecurity capability for the Joint Information Environment (JIE), including the DoD Cloud and mobile device strategies and roadmaps. <p>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.</p> <ul style="list-style-type: none"> • 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 develop, refine, and implement a Joint Information Environment single security architecture strategy, and the related strategic metrics and enhanced analytical capabilities. • 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. • Continue to develop an overarching international standard, or an improved integrated family of existing standards, for improving supply-chain-risk-management. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> 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. Continue to develop Cloud computing security guidance that details cybersecurity guidance and procedures for use by potential commercial Cloud service providers. Continue the 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	10.313	11.288	8.957

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0303140D8Z O&M DW: <i>Information System Security Program</i>	12.286	11.205	11.906	-	11.906	12.082	11.760	11.412	11.568	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

- Annual FISMA metrics

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

- Evolving JIE cybersecurity metrics

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

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.

	10/1/2013	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020
FY2014 Program Execution								
FY2015 Program Execution								
FY2016 Program Execution								
FY2017 Program Execution								
FY2018 Program Execution								
FY2019 Program Execution								
FY2020 Program Execution								

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303140D8Z / <i>Information Systems Security Program</i>	Project (Number/Name) 140 / <i>Information Systems Security Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 Project Execution	1	2014	4	2015
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303260D8Z / <i>Defense Military Deception Program Office</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	3.492	1.144	0.949	-	-	-	-	-	-	-	-	5.585
891: <i>Defense Military Deception Program</i>	3.492	1.144	0.949	-	-	-	-	-	-	-	-	5.585
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program and associated funding will move from BA-07 to BA-06 starting 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 DoD Military Deception (MILDEC) capability and capacity across the Department of Defense. 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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	1.242	0.951	-	-	-
Current President's Budget	1.144	0.949	-	-	-
Total Adjustments	-0.098	-0.002	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.031	-			
• Departmental Adjustment	-0.067	-	-	-	-
• FFRDC Reduction	-	-0.002	-	-	-

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: Defense Military Deception Program Office (DMDPO)	1.144	0.949	-
FY 2014 Accomplishments: - Further refined experimentation, test and evaluation processes for emerging devices, decoys and technologies enabling MILDEC to meet Department of Defense Components' emergency needs, urgent needs and forecasted priorities.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303260D8Z / <i>Defense Military Deception Program Office</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Developed collaborative frameworks enabling MILDEC considerations in the Acquisition, Technology and Logistics (AT&L) RDT&E life cycle of key capabilities. - Researched, developed and tested high-fidelity next generation decoys and capabilities to meet Combatant Commands and DoD Component MILDEC requirements. - Developed technology feasibility reports on potential deception threats to U.S. systems. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - Continue to research, develop and test high-fidelity next generation decoys and capabilities to meet Combatant Commands and DoD Component MILDEC requirements. - Continue to 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 Components. - 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	1.144	0.949	-

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0303260D8Z O&M DW: <i>Defense Military Deception Program Office</i>	3.743	3.611	-	-	-	-	-	-	-	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 Department of Defense (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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense Date: February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303260D8Z / <i>Defense Military Deception Program Office</i>
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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 Department of Defense’s assigned responsibilities. The following metrics are focused on the ROI of RDT&E activities 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 Combatant Command 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-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
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

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
High-Fidelity Decoys																												
High-Fidelity Decoy Prototype Development	██████████																											
High-Fidelity Decoy Prototype Delivery 1					██████████																							
High-Fidelity Concurrent Test & Evaluation			██████████																									
MILDEC Decoys T&E																												
MILDEC Decoy Development	██████████																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0303260D8Z / <i>Defense Military Deception Program Office</i>	Project (Number/Name) 891 / <i>Defense Military Deception Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>High-Fidelity Decoys</i>				
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
<i>MILDEC Decoys T&E</i>				
MILDEC Decoy Development	1	2014	4	2015

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305125D8Z I <i>Critical Infrastructure Protection (CIP)</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	22.153	9.711	8.834	-	-	-	-	-	-	-	Continuing	Continuing
125: <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>	22.153	9.711	8.834	-	-	-	-	-	-	-	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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305125D8Z I <i>Critical Infrastructure Protection (CIP)</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	9.728	8.846	7.308	-	7.308
Current President's Budget	9.711	8.834	-	-	-
Total Adjustments	-0.017	-0.012	-7.308	-	-7.308
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.013	-			
• Other Adjustments	-0.004	-	-	-	-
• FFRDC (Sec 8104)	-	-0.012	-	-	-
• Transfer funding to organizations that execute DCIP	-	-	-7.308	-	-7.308

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0305125D8Z / <i>Critical Infrastructure Protection (CIP)</i>				Project (Number/Name) 125 / <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
125: <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>	22.153	9.711	8.834	-	-	-	-	-	-	-	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 2014	FY 2015	FY 2016
Title: Defense Critical Infrastructure Program (DCIP)	9.711	8.834	-
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			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305125D8Z / <i>Critical Infrastructure Protection (CIP)</i>	Project (Number/Name) 125 / <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>foreign infrastructure essential to planning, mobilizing, deploying and sustaining United States military operations on a global basis.</p> <p><i>FY 2014 Accomplishments:</i></p> <ul style="list-style-type: none"> - Continued to develop the MARMS system which will be the common database for the DCIP program. - Funded the DoD sector to do technical analysis on how to better integrate cyber assets and cyber vulnerabilities into the DCIP program. - 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. <p><i>FY 2015 Plans:</i></p> <ul style="list-style-type: none"> - 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	9.711	8.834	-

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305125D8Z / <i>Critical Infrastructure Protection (CIP)</i>	Project (Number/Name) 125 / <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>
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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Defense Critical Infrastructure Program	MIPR	Various : Various	22.153	9.711	Apr 2014	8.834	Mar 2015	-		-		-	-	-	-
Subtotal			22.153	9.711		8.834		-		-		-	-	-	-
Project Cost Totals			22.153	9.711		8.834		-		-		-	-	-	-

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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305125D8Z / <i>Critical Infrastructure Protection (CIP)</i>	Project (Number/Name) 125 / <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>
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FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
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

<i>Critical Infrastructure Protection Management</i>	
Critical Assets Assessments	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305125D8Z / <i>Critical Infrastructure Protection (CIP)</i>	Project (Number/Name) 125 / <i>CRITICAL INFRASTRUCTURE PROTECTION (CIP)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Critical Infrastructure Protection Management</i>				
Critical Assets Assessments	1	2014	2	2016

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305186D8Z I <i>Policy R&D Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	12.132	3.332	7.055	4.182	-	4.182	3.223	3.460	3.739	3.803	Continuing	Continuing
186: <i>Policy R&D Programs</i>	12.132	3.332	7.055	4.182	-	4.182	3.223	3.460	3.739	3.803	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)

	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	4.210	7.065	5.213	-	5.213
Current President's Budget	3.332	7.055	4.182	-	4.182
Total Adjustments	-0.878	-0.010	-1.031	-	-1.031
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.842	-			
• SBIR/STTR Transfer	-0.033	-			
• Other Adjustments	-0.003	-	-1.020	-	-1.020
• FFRDC (Sec 8104)	-	-0.010	-	-	-
• Economic Adjustment	-	-	-0.011	-	-0.011

Change Summary Explanation

FY 2016 adjustment made to support OUSD(P) higher priority program requirements.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
186: Policy R&D Programs	12.132	3.332	7.055	4.182	-	4.182	3.223	3.460	3.739	3.803	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 2014	FY 2015	FY 2016
Title: Future Security Challenges	1.622	3.580	2.409
<p>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.</p> <p>FY 2014 Accomplishments:</p> <p>Funding supported the establishment of the Conflict Records Research Center. The purpose for funding was the establishment of a digital research database which included translations to facilitate research and analysis of records captured from countries, organizations, and individuals, now or once hostile to the United States, with rigid adherence to academic freedom and integrity.</p> <ul style="list-style-type: none"> • Performed trend analysis and developed mitigation options for addressing program risks. • Finalized and applied risk management methodologies to identified program areas. • Developed net-centric enterprise technologies to remove international sharing barriers identified with maritime information, intelligence, and data being collected by DoD and foreign governments. • Researched military competition among nations in the Far and Middle East and highlight potential capabilities and policies each nation may utilize in future armed conflicts. • Enhanced strategies and relationships with European nations based on the exchange of information through education opportunities and existing policies • Researched and analyzed 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015		
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 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> Continued research efforts within the Services and Combatant Commands to better analyze and demonstrate enduring counterinsurgency operational capabilities. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> 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. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> 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		0.900	1.815	0.905
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				

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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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
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>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.</p> <p>FY 2014 Accomplishments: Specific efforts are classified.</p> <p>FY 2015 Plans: Specific efforts are classified.</p> <p>FY 2016 Plans: Specific efforts are classified.</p>			
<p>Title: Defense Planning Scenarios Activities</p> <p>Description: This program is classified.</p> <p>FY 2014 Accomplishments: Specific efforts are classified.</p> <p>FY 2015 Plans: Specific efforts are classified.</p> <p>FY 2016 Plans: Specific efforts are classified.</p>	0.810	1.660	0.868
Accomplishments/Planned Programs Subtotals	3.332	7.055	4.182

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-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Future Security Challenges	MIPR	Various : Various	12.132	2.482	Jul 2014	5.395	Jun 2015	3.314	Jul 2016	-		3.314	-	-	-
Subtotal			12.132	2.482		5.395		3.314		-		3.314	-	-	-

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)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Defense Planning Scenarios Activities	MIPR	Various : Various	-	0.850	Apr 2015	1.660	Jul 2015	0.868	Jun 2016	-		0.868	-	-	-
Subtotal			-	0.850		1.660		0.868		-		0.868	-	-	-

			Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			12.132	3.332	7.055	4.182	-	4.182	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
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

<i>Future Security Challenges</i>	
Analytical Support	
<i>Defense Planning Scenarios Activities</i>	
Research and Analytical Support	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

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
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Future Security Challenges</i>				
Analytical Support	1	2014	4	2020
<i>Defense Planning Scenarios Activities</i>				
Research and Analytical Support	1	2014	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	16.005	23.950	18.130	-	18.130	18.518	19.550	20.773	21.053	Continuing	Continuing
199: <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>	0.000	16.005	23.950	18.130	-	18.130	18.518	19.550	20.773	21.053	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) of the joint information environment (JIE) 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 C4II 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 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 Global Information Grid (GIG) enterprise-wide

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>
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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. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	16.490	23.984	17.446	-	17.446
Current President's Budget	16.005	23.950	18.130	-	18.130
Total Adjustments	-0.485	-0.034	0.684	-	0.684
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.478	-			
• Program Adjustments	-0.007	-	0.732	-	0.732
• FFRDC Reduction	-	-0.034	-	-	-
• Economic Assumption	-	-	-0.048	-	-0.048

Change Summary Explanation

FY 2014: SBIR/STTR Reduction -0.478 million, Program Adjustment -0.007 million.

FY 2015: FFRDC Reduction -0.034 million.

FY 2016: Economic Assumption -0.048 million, Program Adjustment 0.732 million.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense										Date: February 2015		
Appropriation/Budget Activity 0400 / 7					R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>				Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
199: <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>	-	16.005	23.950	18.130	-	18.130	18.518	19.550	20.773	21.053	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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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

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 2014	FY 2015	FY 2016
<p>Title: Net Centricity Plans and Accomplishments</p> <p>FY 2014 Accomplishments: Conducted research on Use of Commercial Wireless Devices to support CMD strategy implementation; assessed effects of new cybersecurity policies on commercial wireless devices. – updated CMD certification process, Mobile Application Management (MAM) and Mobile Device Management (MDM) guidance, developed approved product matrix for CMD and MDM. – Developed the Mobile Application Strategy and initial DoD Blackberry Strategy – Developed Mobile Application Approval process guide, DoD Mobile PKI guidance, and CMD procedure for Electronic Flight Bag (EFB) – Provided technical/business case analyses for CMD and voice encryption. – Developed initial Radio/Communication Security modernization plan for tactical radios. Analyzed Service implementation data calls – Conducted analysis to update Combined Joint Task Force (CJTF) Architecture v5.0 to reflect component C4I capability plans – Supported development of interoperable Land Mobile Radio (LMR) standards to support public safety communications and FirstNet – Analyzed requirements and technologies/standards; established procedures for Waveform Development and Management in the DoD – Developed Waveform Implementation Guide and authoritative list of DoD-approved waveforms, with a process/supporting repository to maintain the approved waveform baseline – Provided technical analysis on methods for securing ISR data over wireless platforms and extended encryption of these devices, assessed implementation through UAS encryption data calls – Conducted technical SATCOM analysis (Protected, Wideband, Narrowband, Commercial); developed initial SATCOM capability strategy – Updated SATCOM Synchronization Architectures for Protected, Wideband, Narrowband and Commercial SATCOM capabilities. Developed improvements to integrate SATCOM Sync Architectures into overall DoD CIO assessment processes – Conducted compliance reviews of select programs; identified shortfalls in program bandwidth supportability planning and analysis; provided recommendations for corrective action. – Updated Defense Acquisition Guidebook (DAG) procedures to improve bandwidth supportability</p>	16.005	23.950	18.130

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Conducted SATCOM Gateway Right-sizing Study and assessed approaches to optimize SATCOM gateways across the defense enterprise. - Conducted technical analysis to support PACOM gateway implementation. - Conducted technical and requirements analysis to determine way ahead for future Narrowband SATCOM capabilities. Assessed feasibility on implementing legacy narrowband solutions for MUOS payload - Conducted analysis to determine approach to implement JIPM evolution and deployment strategy - Conducted technical analysis to assess options in support of the Protected SATCOM AoA - Conducted technical analysis and developed options to improve DoD utilization of Commercial SATCOM capabilities - Conducted capability gaps analysis and developed an initial capability document for Airborne ISR (AISR) transport capabilities. Developed AISR transport reference architecture to support the ICD - Developed a PNT capability inventory strategy and process to support the long term PNT strategy. - Provided technical development and analysis to support the evolution of Multi-National Information Sharing programs, related acquisition strategies, and functional requirements to enable continued development of C2 Information Sharing mechanisms and capabilities to enhance capability strategies. - Conducted technical analysis and policy support with emphasis on Coalition C2 and Multi-National Information Sharing (MNIS), including technical analysis of Coalition C2 functional requirements, strategic policy development and capability strategies addressed by the international community (inclusive of multilateral and bi-lateral engagements) - Conducted technical analysis of selected joint and military Service C2 programs and initiatives to promote net-centric approaches for data, services and enterprise deployments and support integrated sustainment and modernization planning. - Provided technical assessments to inform and influence Mission Partner Environment (MPE) development and implementation activities. - Provided technical analysis and support for the development of Common Mission Network Transport (CMNT) capability. - Conducted technical analysis to inform updates to Joint C2 technical and architectural artifacts to guide transition of Global Command and Control Family of Systems to a network enabled, joint information enterprise. - Analyzed approaches, potential costs and schedules to establish net-centric C2 capabilities consistent with Department objectives. - Conducted requirements/gap analysis of all joint requirements documents and associated architectures for C4II capabilities - Conducted technical analysis for Airborne ISR data delivery. Developed AISR SATCOM reference document, GIG Technical Profile, and architecture artifacts to support evaluation of alternatives - Conducted Common Data Link (CDL) technical analysis and demonstrated RIVET as a candidate database for CDL management 			

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Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Performed DoD Commercial Mobility implementation and systems engineering analysis including: evaluation of alternatives for Mobility IDAM; analysis of industry rates for bringing commercial broadband to DoD sites; and workflow, provisioning and cost analysis for Defense Mobile Unclassified Capability (DMUC) - Developed Blackberry Transition Strategy; developed guidance to implement derived credentials. - Conducted analysis of LTE technology for DoD tactical use - Developed Network Management (NM) interoperability, architecture and data artifacts to support NM strategy implementation - Developed concept of operations, capabilities profiles and architecture considerations for JIE tactical processing nodes (TPNs). - Conducted analysis and developed a proposed framework and assessment plan for implementation of Tactical Secure Voice Communications Interoperability Specification (TSVSIC) for tactical radios - 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 GIG Technical Profiles and Reference Implementations for network management - Developed data ontologies and NIEM compliant Information Exchange Package Descriptions (IEPDs) for network management. - Conducted technical analysis to support C4II related policies, plans, studies, roadmaps, and C4II capability assessments. - Conducted analysis of the Narrowband SATCOM environment; developed the Future Narrowband SATCOM Architecture artifacts - Conducted studies and developed analytical papers to support DoD Mobile Device Strategy and Mobile Device Security Efforts - Conducted technical analysis/studies related to the migration of current applications and services to DoD Core Data Centers. Developed decision matrices to support the rationalization of applications for the JIE. - Conducted technical analysis to support the Joint Technology Synchronization Office (JTSO) Integrated Design Team (IDT) efforts related to implementation of JIE capability upgrades, and support JIE Increment 2 technical planning. - Conducted studies and analysis to refine metrics and assess progress of Joint Information Environment (JIE) technical implementation - Conducted analysis of Tactical Secure Voice Cryptographic Interoperability Specification (TSVCIS) to support tactical radios - Conducted analysis and developed implementation strategies to promote IPV6 use in tactical systems. - Continued follow-on Joint Aerial Layer Network analysis with Joint Service JALN Council, overseeing Service implementation efforts - Continued JALN capability Non-Recurring Engineering (NRE) development. - Continued technical efforts to stand up Interoperability Enhancement Process (IEP) working with DISA, J6, and Services. - Conducted technical and policy assessments to enable Tactical Data Link (TDL) migration. - Initiated Common Data Link (CDL) movement to documenting a Drafted MIL-SPEC to support Joint Interoperability. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Supported Allied and Coalition interoperability efforts including NATO migration plan, Joint Strike Fighter (JSF) partner interoperability, US/Swedish Master Information Exchange Agreement (MIEA), and integration of US and foreign communications and C2 systems - Published 2014 Joint Tactical Data Link (TDL) Migration Plan (JTMP) with both policy and migration plan. - Conducted Network Analysis of Inter-network Architectures including Inter Mobile Ad-hoc Network (MANET) Routing (InterMR) alternatives to support Joint Aerial Layer Network (JALN) capabilities. - Assessed JALN Line of Sight (LOS) communications with ground and flight test evaluations to characterize radio frequency performance for JALN aerial, ground, and maritime nodes, Advanced Networking Waveform Two (ANW2) used to support the tests. - Evaluated feasibility of Delay Tolerant Networking (DTN) architectures and alternatives to support JALN capabilities. - Refined gateway right sizing options, proposed RF terminal solutions and baseband equipment suites including the number and types of equipment needed to meet the future needs of the war fighter. Coordinated and facilitated Teleport Program Office oversight initiatives. - Conducted follow-on analysis to formalize JIPM evolution and deployment strategies to support video dissemination and two-way GBS capabilities to inform follow on implementation across the Department. - Conducted analysis for the SATCOM International Standards Committee (SISC). Support development of US lead Standardized Agreements (STANAGS) and provided technical reviews of other nation's STANAG's for accuracy, completeness, and feasibility. - Developed acquisition strategy for U.S. support to NATO SATCOM post 2019. - Provided technical analysis and facilitated execution of the SATCOM Systems Engineering Group (SSEG). - Reviewed, Assessed and Processed FY14 DISN Tech Refresh Plan for CIO approval. - Coordinated, facilitated and recorded DISN Quarterly reviews to assessed progress and issues in transport and network infrastructure, unified capabilities and network management - Developed and coordinated with Services a JIE Infrastructure Framework to support MILDEP and DISAs JIE infrastructure deployment or implementation - Developed acquisition like review of JIE objectives, plans, technical approach, schedule and cost factors to support review <p>FY 2015 Plans: \$5.000 million supports classified program, Details can be provided at a higher classification under separate cover.</p> <p>\$18.950million supports: - Conduct technical assessment/refine commercial wireless policy guidance to support CMD strategy implementation; continue assessments of the effects of cybersecurity policy.</p>			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> – Refine CMD certification processes, Mobile Application Management (MAM)/Mobile Device Management (MDM) guidance, and guidance for personal user based enforcement; update approved product matrix for CMD – Conduct implementation assessments to refine Mobile Application Strategy and Blackberry Strategy – Update Mobile Application Approval process guide, DoD Mobile PKI guide, and procedure for the Electronic Flight Bag (EFB) – Provide 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 – Conduct analysis and update the CJTF Architecture to reflect component C4II capability plans – Continue development of interoperable Land Mobile Radio (LMR) standards to support public safety communications and FirstNet – Conduct analysis to update LMR policy to refine procedures for LMR implementation in the DoD – Conduct analysis and refine procedures for Waveform Development and Management in the DoD. – Evolve 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 – Provide 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 – Provide technical analysis and support for Protected, Wideband, Narrowband, and Commercial SATCOM. Developed an initial strategy and policy to guidance optimize SATCOM capabilities. – Update SATCOM Synchronization Architectures for Protected, Wideband, Narrowband and Commercial SATCOM capabilities. Continue efforts to integrate SATCOM Sync Architectures into overall DoD CIO assessment processes – Conduct compliance reviews of select programs; identify shortfalls in program bandwidth supportability planning and analysis and provide recommendations for corrective action. Submit annual Bandwidth report to Congress as required by NDAA – Continue SATCOM Gateway Right-sizing Study and develop implementation approaches to optimize SATCOM gateways across the defense enterprise. Provide technical analysis to support PACOM gateway implementation. – Continue technical and requirements analysis to determine way ahead for future Narrowband SATCOM capabilities. Continue feasibility assessments for implementing legacy narrowband solutions for MUOS payload – Continue analysis to determine approach to implement JIPM evolution and deployment strategy – Provide technical analysis to assess options in support of the Protected SATCOM AoA – Continue technical analysis to implement approaches to improve DoD utilization of Commercial SATCOM capabilities – Conduct an evaluation of alternatives to address Airborne ISR (AISR) transport capability gaps. Update AISR transport reference architecture artifacts to support assessments. – Continue technical analysis of Coalition C2 and MNIS, analyze Coalition C2 functional requirements, strategic policy development and capability strategies to guide Mission Partner Environment development. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Conduct 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. - Provide technical analysis for the implementation of Common Mission Network Transport (CMNT) capability. - Provide technical analysis of MNIS programs and initiatives, related acquisition strategies, and functional requirements; continue development of C2 information sharing metrics and mechanisms consistent with capability strategies - Conduct analysis to refine the joint C2 technical and architectural artifacts and inform transition of GCCS Family of Systems to a network enabled applications and services rationalized for the JIE - Provide studies and analysis of the C2 capability gaps to inform investment strategies, enable investment tracking, and POM development - Conduct analyses to address adoption and evolution of C2 mission services as candidate enterprise services for the JIE. - Continue requirements/gap analysis of all joint requirements for C4II capabilities - Continue wireless architecture and advanced technologies analysis to inform implementation of mobility solutions. - Conduct technical analysis to support compliance oversight of waveform policies and technical profile specifications - Develop updates to Department-wide communications policies applicable to commercial mobile devices - Continue DoD Commercial Mobility implementation and systems engineering analysis Defense Mobile Unclassified and Classified Capabilities (DMUC/DMCC) - Conduct 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 analysis to address Tactical Secure Voice Communications Interoperability Specification (TSVSIC) implementation - 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 - Conduct technical analysis/develop GTPs and Reference Implementations in support of network management strategy and roadmap. - Continue development of data ontologies and NIEM compliant IEPDs for network management. - Conduct technical analysis in support of C4II policies, plans, studies, roadmaps, and capability assessments. - Continue end-to-end analysis of the SATCOM environment; support evaluations and analysis of end-to-end capabilities - Conduct studies and develop analytical papers 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. 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> – Provide 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. – Conduct studies and analysis to finalize metrics and assess progress of JIE technical implementation actions. – Conduct technical analysis and studies related to Software Defined Networking (SDN) as an approach to network normalization – Continue follow-on JALN analysis with Joint Service JALN Council, overseeing Service implementation efforts – Continue JALN capability Non-Recurring Engineering (NRE) development. – Develop foundation for Interoperability Enhancement Process (IEP) for Joint capabilities with DISA/J6 Enterprise Toolset and Data Base. – Conduct technical and policy assessments to enable Tactical Data Link (TDL) migration. – Continue Joint Common Data Link (CDL) documentation of official waveform in support of Joint interoperability. – Support 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 – Publish Joint TDL Migration Department of Defense Issuance (DoDI) for Joint migration policy. – Evaluate available Delay Tolerant Network (DTN) technology and architecture alternatives to support JALN capability development. – Evaluate High Frequency (HF) waveform characteristics and performance (including anti-jam) to support JALN capabilities. – Analyze available Gateway architecture alternatives to support inter-platform connectivity and reach back to JALN. – Assess performance of airborne and ground tactical domain waveform alternatives to support additional platforms, emerging applications and Service mission needs in support of JALN capabilities. – Analyze available directional networking technologies to support scalable Tactical Data Link (TDL) communications in high threat environments such as the JALN Anti Access/Area Denial (A2/AD) operations. – Refine gateway right sizing options; propose RF terminal solutions and baseband equipment suites including the number/types of equipment needed to meet the future warfighter needs. Coordinate and facilitate Teleport Program Office oversight initiatives. – Conduct analysis to evolve SATCOM networks toward an EOIP modem architecture. Continue support of video dissemination and two-way GBS capabilities to inform follow on implementation across the Department. – Conduct analysis for the SATCOM International Standards Committee. Support development of US lead Standardized Agreements (STANAGS) and provide a technical review of other nation's STANAG's for accuracy, completeness, and feasibility. – Develop acquisition strategy for U.S. support to NATO SATCOM post 2019. – Provide technical analysis and facilitate execution of the SATCOM Systems Engineering Group (SSEG). – Review, Assess and Process FY15 Defense Information Systems Network (DISN) Tech Refresh Plan for CIO approval. – Support DISN Quarterly reviews to assessed progress and issues in transport and network infrastructure, unified capabilities and network management 			

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Coordinate with DISA and MILDEPs to maintain and expand the JIE Infrastructure Framework to evolve into an infrastructure synchronization roadmap that tracks infrastructure deployment or implementation - Revise acquisition like review of JIE objectives, plans, technical approach, schedule and cost factors - Support the development of business case activities as required for C4II capabilities <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Continue technical assessment/refine commercial wireless policy guidance to support CMD strategy implementation; continue assessments of the effects of cybersecurity policy. - Continue CMD certification processes, refine Mobile Application Management (MAM)/Mobile Device Management (MDM) guide, and guide for personal user based enforcement; update approved product matrix for CMD - Continue implementation assessments to refine Mobile Application Strategy and Blackberry Strategy - Review/refine Mobile Application Approval process guide, DoD Mobile PKI guide, 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 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. - 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 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continue analysis to support implementation approaches for JIPM evolution and deployment strategy - Conduct follow-on analysis in support of the Protected SATCOM AoA - Continue technical analysis to improve DoD utilization of Commercial SATCOM capabilities - Conduct Airborne ISR (AISR) transport AoA follow-on analysis. Update AISR transport reference architecture 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 development. - Continue 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. - 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 development of C2 information sharing metrics and mechanisms consistent with capability strategies - Continue analysis to refine the joint C2 technical and architectural artifacts and inform transition of GCCS Family of Systems to a network enabled applications and services rationalized for the JIE - Continue studies and analysis of the C2 capability gaps to inform investment strategies, enable investment tracking, and POM development - Continue analyses to address adoption and evolution of C2 mission services as candidate enterprise services for the JIE. - Continue requirements/gap analysis of all joint requirements for C4II capabilities - 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 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. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - 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 follow-on JALN analysis with Joint Service JALN Council, overseeing Service implementation efforts - Continue JALN capability NRE development. - Stand up Joint IEP team starting with 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 - Publish Joint TDL Migration plan in support of TDL Migration policies. - Assess available technologies for adaptive digital radio frequency beam forming capabilities for robust and scalable networking in JALN A2/AD environments. - Analyze available Gateway technology alternatives to address JALN capabilities in the evolving threat environment with both physical (eg jamming) and cyber-attacks. - Assess developing waveform technologies for improving the robustness and scalability of current TDL networks supporting JALN including lab and flight testing. - Assess developing Laser communications technologies available to support JALN capabilities. - 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 			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<ul style="list-style-type: none"> - Continue technical analysis and facilitate execution of the SATCOM Systems Engineering Group (SSEG) - Continue efforts to review, assess and process DISN Tech Refresh Plan 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 approach, schedule and cost factors to support review of JIE - Support the development of business case activities as required 			
Accomplishments/Planned Programs Subtotals	16.005	23.950	18.130

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

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>
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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Studies and Analysis	Various	Various : Various	-	1.149	Jul 2014	1.010	Jul 2015	0.967	Jul 2016	-		0.967	Continuing	Continuing	Continuing
Technical Engineering Services	Various	Various : Various	-	8.732	Jul 2014	16.810	Jul 2015	11.293	Jul 2016	-		11.293	Continuing	Continuing	Continuing
Subtotal			-	9.881		17.820		12.260		-		12.260	-	-	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support	Various	Various : Various	-	3.514	Jul 2014	3.967	Jul 2015	3.799	Jul 2016	-		3.799	Continuing	Continuing	Continuing
Program Support	FFRDC	Various : Various	-	0.100	Jul 2014	0.088	Jul 2015	0.084	Jul 2016	-		0.084	Continuing	Continuing	Continuing
Engineering Support	FFRDC	Various : Various	-	0.200	Jul 2014	0.176	Jul 2015	0.169	Jul 2016	-		0.169	Continuing	Continuing	Continuing
R&D Support	Various	Various : Various	-	2.310	Jul 2014	1.899	Jul 2015	1.818	Jul 2016	-		1.818	Continuing	Continuing	Continuing
Subtotal			-	6.124		6.130		5.870		-		5.870	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		-	16.005	23.950	18.130	-	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

R4								
PE 0305199D8Z/ <i>Net Centricity</i>								
SATCOM, JIE, NC3 and Related Engineering Analysis								
	10/1/2013	10/1/2014	10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020
FY2014 Program Execution	█	█						
FY2015 Program Execution		█	█					
FY2016 Program Execution			█	█				
FY2017 Program Execution				█	█			
FY2018 Program Execution					█	█		
FY2019 Program Execution						█	█	
FY2020 Program Execution								█

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305199D8Z / <i>Net Centricity</i>	Project (Number/Name) 199 / <i>GIG Evaluation Facilities (GIG-EF) and GIG Enterprise-Wide Systems Engineering Advisory Activities</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY14 Project Execution	1	2014	4	2015
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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0305387D8Z I Homeland Defense Technology Transfer Program
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	4.788	2.308	2.106	2.119	-	2.119	2.194	2.317	2.462	2.495	Continuing	Continuing
387: Homeland Defense Technology Transfer Program	4.788	2.308	2.106	2.119	-	2.119	2.194	2.317	2.462	2.495	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In conjunction with Congressionally directed (Sec. 1401, P.L. 107-314) Technology Transfer outreach program, ensures a successful and balanced transfer of dual-use technology equipment and information without impeding military readiness. Manages what first responders receive, achieves a balance between first responders and military equipment, and transfers technology through a transitional effort that has dual utility to enhance 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 property is made available to the first responder community on an expedited basis.

B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	2.327	2.110	2.133	-	2.133
Current President's Budget	2.308	2.106	2.119	-	2.119
Total Adjustments	-0.019	-0.004	-0.014	-	-0.014
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.018	-			
• Other Adjustment	-0.001	-	-0.008	-	-0.008
• FFRDC (Sec 8104)	-	-0.004	-	-	-
• Economic Adjustment	-	-	-0.006	-	-0.006

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305387D8Z / <i>Homeland Defense Technology Transfer Program</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
<p>Title: Homeland Defense Technology Transfer Program</p> <p>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.</p> <p>FY 2014 Accomplishments:</p> <ul style="list-style-type: none"> - Implemented efficiencies identified through research on program best practices. - Used a consortium of subject matter experts/governance councils to prioritize technology transfer requirements and supported efforts to expedite DoD dual-use technologies to address requirements. - Continued program outreach activities and prioritized outreach to reflect efficiencies. - Enhanced and expedited excess equipment transfer capabilities from overseas draw down efforts. <p>FY 2015 Plans:</p> <ul style="list-style-type: none"> - 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. <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - 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. 	2.308	2.106	2.119
Accomplishments/Planned Programs Subtotals	2.308	2.106	2.119

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity
0400: *Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development*

R-1 Program Element (Number/Name)
PE 0305387D8Z / *Homeland Defense Technology Transfer Program*

E. Acquisition Strategy

N/A

F. Performance Metrics

As stated.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305387D8Z / <i>Homeland Defense Technology Transfer Program</i>	Project (Number/Name) 387 / <i>Homeland Defense Technology Transfer Program</i>
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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Defense Logistics Agency Support	MIPR	DLA J/3 : Alexandria VA	1.000	0.481	Jun 2014	0.496	May 2015	0.094	Dec 2015	-		0.094	-	-	-
Subtotal			1.000	0.481		0.496		0.094		-		0.094	-	-	-

Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support to program for dual use technologies	MIPR	Various : DoD Agencies	3.788	1.827	Sep 2014	1.610	Jun 2015	2.025	May 2016	-		2.025	-	-	-
Subtotal			3.788	1.827		1.610		2.025		-		2.025	-	-	-

Remarks
Consolidate and coordinate various Military endeavors

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.788	2.308	2.106	2.119	-	2.119	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305387D8Z / <i>Homeland Defense Technology Transfer Program</i>	Project (Number/Name) 387 / <i>Homeland Defense Technology Transfer Program</i>

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Current DoD Property Support																												
DLA LESO Support																												
Support Dual Use Technologies																												
Expedite advanced DoD technologies																												
Center for Commercialization of Advanced Technologies																												
InterAgency Board Support																												
Outreach																												
DLA HQ Support																												
DoD and InterAgency Coordination																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305387D8Z / <i>Homeland Defense Technology Transfer Program</i>	Project (Number/Name) 387 / <i>Homeland Defense Technology Transfer Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Current DoD Property Support				
DLA LESO Support	1	2014	4	2020
Support Dual Use Technologies				
Expedite advanced DoD technologies	1	2014	4	2020
Center for Commercialization of Advanced Technologies	1	2014	4	2020
InterAgency Board Support	1	2014	4	2020
Outreach				
DLA HQ Support	1	2014	4	2020
DoD and InterAgency Coordination	1	2014	4	2020

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Exhibit R-5, RDT&E Termination Liability: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305387D8Z / <i>Homeland Defense Technology Transfer Program</i>	Project (Number/Name) 387 / <i>Homeland Defense Technology Transfer Program</i>
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Cost (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Program Termination Liability	0.000	-	-	-	-	-	-	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	5.593	4.363	-	-	-	-	-	-	-	-	-	9.956
997: <i>International Intelligence Technology and Architectures</i>	5.593	4.363	-	-	-	-	-	-	-	-	-	9.956

Note

Funding was transferred to Air Force in FY 2015.

A. Mission Description and Budget Item Justification

Provided for the identification, migration and integration of existing and advanced multi-lateral and bi-lateral international intelligence information virtual advanced analytics, algorithmic data fusion, and multi-level security cross domain technologies into an integrated US, North Atlantic Treaty Organization (NATO), and coalition intelligence service oriented architecture/data repository such as the US and NATO Battlefield Information Collection and Exploitation System(s) (BICES). Provided rapid implementation of US BICES Extended (US BICES-X) capabilities into the Distributed Common Ground/Surface System (DCGS) and the Defense Intelligence Information Enterprise (DI2E) intelligence decision applications and data mechanisms in support of the Under Secretary of Defense's (Intelligence) mission to ensure necessary intelligence information is being acquired, analyzed, and disseminated rapidly among our allies and coalition partners. Developed US BICES-X as the "enduring" coalition intelligence support element of the DI2E. Continued the development of the Trusted Network Environment (TNE) multi-level security database, web, and e-mail capabilities for U.S. Central Command (CENTCOM), U.S. European Command (EUCOM), U.S. Africa Command (AFRICOM), and U.S. Pacific Command (PACOM), U.S. Special Operations Command (SOCOM), Northern Command (NORTHCOM), Southern Command (SOUTHCOM) and other related organizations. Supported the research and development of 50+ High Assurance Connection Interfaces to Combatant Command identified bi-lateral and multi-lateral partners, developed the multi-level security rule sets and developed Ozone Widget Framework with applicable cloud widgets that can transverse the multi-level security boundaries. Developed, tested, and integrated intelligence mission applications that interface with and support the development of the DoD/CIO Coalition Partner Network (CPN).

Funding transfers to Air Force starting in FY 2015.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Office of the Secretary Of Defense	Date: February 2015
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>
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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	4.363	-	-	-	-
Current President's Budget	4.363	-	-	-	-
Total Adjustments	-	-	-	-	-
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Change Summary Explanation

Funding transfers to Air Force starting in FY 2015.

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 997 / <i>International Intelligence Technology and Architectures</i>
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
997: <i>International Intelligence Technology and Architectures</i>	5.593	4.363	-	-	-	-	-	-	-	-	-	9.956
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding transfers to Air Force beginning in FY 2015.

A. Mission Description and Budget Item Justification

Provided for the migration and integration of existing and advanced multinational and bi-lateral international intelligence information virtual advanced analytics, algorithmic data fusion and multi-level security cross domain technologies into an integrated US, NATO and coalition intelligence service oriented architecture/data repository such as the US and NATO BICES. Provided for rapid implementation of US BICES capabilities into the DCGS and the DI2E intelligence decision applications and data mechanisms in support of USD(I)'s mission to ensure necessary intelligence information is being acquired, analyzed and disseminated rapidly among our allies and coalition partners. Developed US BICES as the "enduring" coalition intelligence component of the DI2E. Continued development of the TNE multi-level security database, web and e-mail capabilities for US BICES.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016
Title: International Intelligence Technology and Architectures	4.363	-	-
FY 2014 Accomplishments: Continued migration of other federated architectures to incorporate multi-level security (Oracle Trusted Cross Domain Systems) capabilities for bi-lateral and multi-lateral data dissemination and discovery information sharing techniques into existing US, NATO and coalition networks supporting on-going SOF and conventional operational intelligence needs. Further incorporated design of DI2E capabilities for US BICES. Continued US BICES application integration. Developed and migrated critical mission applications to run within the TNE multi-level security boundary. Allowed multiple bi-lateral and multi-lateral connections through the High Assurance Connection Interfaces to access the operational intelligence mission software portals and services with the data elements tagged to allow only the intelligence information that is releasable to the particular partner to be exchanged. Provided research and development of the software applications necessary to ensure the PL-4 level security certification remains intact and will allow multi-level security between the secret, secret releasable, and NATO secret levels. Provided research into whether the unclassified level can be connected in conjunction with higher level security levels. Provided research and development to allow for US intelligence analysts to view not only US SIPRNET but multiple bi-laterals and multi-lateral windows on a single workstation.			
Accomplishments/Planned Programs Subtotals	4.363	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 997 / <i>International Intelligence Technology and Architectures</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0305600D8Z Proc DW: <i>International Intelligence Technology and Architectures</i>	16.678	-	-	-	-	-	-	-	-	-	16.678
• 0305600D8Z O&M DW: <i>International Intelligence Technology and Architectures</i>	60.632	-	-	-	-	-	-	-	-	-	60.632

Remarks

D. Acquisition Strategy

Performance was monitored on a monthly basis via Program Reviews, Current Expenditures, Estimated Future Expenditures and Cost/Schedule Adherence. Research and Development provided increased intelligence information sharing capabilities in support of US and coalition forces utilizing the US BICES and NATO virtual networks within the Afghanistan theater and provided increased database information via Distributed Common Ground System - Army. Provided an increase in intelligence disciplines (Imagery Intelligence, Signal Intelligence and potential Human Intelligence) in support of US and Allied/Coalition forces that currently is very limited to the warfighter. Increased intelligence advanced analytics tools will be migrated from Joint Intelligence Operations Center-IT and DI2E developments and will significantly increase the timeliness of intelligence and bring US BICES/NATO Special Operations Forces Headquarters/NATO Intelligence Fusion Center capabilities into the current technology baselines. Developed and provided a federated TNE that incorporates the Asian Pacific Intelligence Information Network being developed to support the National Defense Strategy as we transition out of Afghanistan and into the Pacific. Provided multi-level security intelligence bi-laterals and multi-laterals to meet Combatant Commander Integrated Priority Lists. Developed the Coalition Partner Network for CENTCOM, the Coalition Information Exchange Network for SOUTHCOM, and the Coalition Partner Network for EUCOM and AFRICOM. Developed the US BICES connections with these bi-lateral and multi-lateral federated TNEs that make up the US BICES-X Enterprise Network in support of Commander SOCOM requirements for conventional and coalition operations as the US migrates into other Combatant Command regions.

E. Performance Metrics

Assessment and Analysis - Whether it can easily be adapted or adjusted to meet the current or projected capabilities gap for Allied or Coalition Intelligence Information Sharing and for the Intelligence integration into the Future Mission Network.

Realism – Allows exploration of new environments and capabilities through participation in exercise environments that utilize bi-lateral and multi-lateral intelligence enterprise solutions such as US BICES-X.

Advancement - Increases the current capabilities for the sharing of intelligence information and determines if it actually adds functionality in support of Combatant Commanders requirements through exercises such as Unified Vision, Enterprise Challenge, and the MAJIIC (multi-sensor aerospace ground joint intelligence, surveillance, and reconnaissance interoperability coalition) exercises.

Utility - Whether it can be integrated into the existing national or multinational architectures in a timely and cost effective manner and the extent to which it increases the discovery and dissemination of intelligence information to the Allies or Coalition forces.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Office of the Secretary Of Defense **Date:** February 2015

Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 997 / <i>International Intelligence Technology and Architectures</i>
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Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Development	Sub Allot	Air Force : Washington, DC	5.393	3.965	Jun 2014	-		-		-		-	-	9.358	-
Subtotal			5.393	3.965		-		-		-		-	-	9.358	-

Remarks
Funds will transfer to Air Force beginning in FY 2015.

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	Sub Allot	Air Force Research Lab : Rome, NY	0.200	0.398	Jan 2014	-		-		-		-	-	0.598	-
Subtotal			0.200	0.398		-		-		-		-	-	0.598	-

Remarks
Funds will transfer to Air Force beginning in FY 2015.

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		5.593	4.363	-	-	-	-	9.956	-

Remarks
Funds will transfer to Air Force beginning in FY 2015.

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Office of the Secretary Of Defense		Date: February 2015
Appropriation/Budget Activity 0400 / 7	R-1 Program Element (Number/Name) PE 0305600D8Z / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 997 / <i>International Intelligence Technology and Architectures</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Software Development				
Continue migration of other federated architectures.	1	2014	4	2014
Continue US BICES application integration.	1	2014	4	2014
Funds transfer to Air Force beginning in FY 2015.	1	2015	4	2020
Test and Evaluation				
Test and Evaluation	1	2014	4	2014
Funds transfer to Air Force beginning in FY 2015.	1	2015	4	2020

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