UNCLASSIFIED

Department of Defense
Fiscal Year (FY) 2010 Budget Estimates

May 2009

Research, Development, Test and Evaluation, Defense-Wide

Volume 3
Office of the Secretary of Defense (OSD)

UNCLASSIFIED

DEPARTMENT OF DEFENSE
Fiscal Year (FY) 2010 Budget Estimates

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Exhibit R-1, RDT&E Programs
(Dollars in Thousands)

Appropriation: 0400 Reseach, Development Test and Evaluation, DW

R-1 Line No.	Program Element Number	Item	Budget Activity	FY 2008	FY 2009	FY2010
		BASIC RESEARCH				
3	0601111D8Z	Government/Industry Cosponsorship of University Research	1	5,012	4,376	0
4	0601114D8Z	Defense Experimental Program to Stimulate Competitive Research	1	19,894	14,752	0
5	0601120D8Z	National Defense Education Program	1	42,447	69,093	89,980
		Subtotal B/A 1		**67,353**	**88,221**	**89,980**
		APPLIED RESEARCH				
7	0602000D8Z	Joint Munitions Technology	2	12,152	15,171	22,669
8	0602227D8Z	Medical Free Electron Laser	2	2,315	0	0
9	0602228D8Z	Historically Black Colleges and Universities (HBCU) Science	2	35,945	41,327	15,164
10	0602234D8Z	Lincoln Laboratory Research Program	2	28,288	31,168	34,034
15	0602663D8Z	Joint Data Management Advance Development	2	0	0	4,940
16	0602670D8Z	Human, Social and Culture Behavior Modeling (HSCB) Applied Research	2	6,074	7,643	9,446
		Subtotal B/A 2		**84,774**	**95,309**	**86,253**
		ADVANCED TECHNOLOGY DEVELOPMENT				
23	0603000D8Z	Joint Munitions Advanced Technology	3	3,941	9,915	23,538
24	0603121D8Z	SO/LIC Advanced Development	3	37,169	33,447	43,808
25	0603122D8Z	Combatting Terrorism Technical Support	3	110,534	123,012	81,868
28	0603200D8Z	Joint Advanced Concepts	3			7,817
29	0603225D8Z	Joint DOD-DOE Munitions Technology Development	3	22,392	23,598	23,276
33	0603618D8Z	Joint Electronic Advanced Technology	3	12,145	10,463	10,838
34	0603648D8Z	Joint Capability Technology Demonstrations (JCTD)	3	202,976	207,096	198,352
35	0603662D8Z	Networked Communication Capabilities	3	29,068	29,759	28,212
36	0603663D8Z	Joint Data Management Research	3			4,935
37	0603665D8Z	Biometrics Science and Technology	3	9,838	10,521	10,993
38	0603670D8Z	Human, Social and Culture Behavior Modeling (HSBC) Advance Development	3	2,960	9,330	11,480
39	0603680D8Z	Defense-Wide Manufacturing Science and Technology Program	3	22,415	18,280	14,638
40	0603711D8Z	Joint Robotics Program/Autonomous Systems	3	18,734	9,198	9,110
43	0603716D8Z	Strategic Environmental Research Program (SERDP)	3	65,780	68,659	69,175
45	0603727D8Z	Joint Warfighting Program	3	10,635	12,031	11,135
47	0603745D8Z	Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	3	3,368	7,940	4,864
48	0603750D8Z	Advanced Concepts Technology Demonstrations	3	1,552	1,194	0
49	0603755D8Z	High Performance Computing Modernization Program	3	198,234	220,345	221,286
57	0603781D8Z	Software Engineering Institute	3	24,719	31,072	31,298
59	0603826D8Z	Quick Reaction Special Projects	3	109,493	106,795	107,984
60	0603828D8Z	Joint Experimentation	3	103,853	108,777	124,480
61	0603832D8Z	DoD Modeling and Simulation Management office	3	22,068	33,602	38,505
62	0603941D8Z	Test & Evaluation for Science & Technology	3	61,224	94,153	95,734
63	0603942D8Z	Technology Transfer	3	7,119	5,738	2,219
64	0909999D8Z	Financing For Cancelled Account Adjustments		4,581		
		Subtotal B/A 3		**1,084,798**	**1,174,925**	**1,175,545**

R-1 Line No.	Program Element Number	Item	Budget Activity	FY 2008	FY 2009	FY2010
		DEMONSTRATION/VALIDATION				
68	0603161D8Z	Nuclear & Conventional Physical Security Equipment RDT&E ADC&P	4	48239	49,882	36,019
69	0603228D8Z	Physical Security Equipment	4	1541	0	0
70	0603527D8Z	Retract Larch	4	22129	22,819	21,718
71	0603709D8Z	Joint Robotics Program	4	23251	11,782	11,803
72	0603714D8Z	Advanced Sensors Applications Program	4	0	15,912	17,771
73	0603851D8Z	Environ Security Technical Certification Program	4	38769	38,691	31,613
98	0603920D8Z	Humanitarian Demining	4	13631	14,294	14,687
99	0603923D8Z	Coalition Warfare	4	9768	13,246	13,885
100	0604016D8Z	Department of Defense Corrosion Program	4	18253	22,279	4,887
101	0604400D8Z	Department of Defense Unmanned Aircraft System Common Development	4			55,289
102	0604648D8Z	Joint Capability Technology Demonstrations (JCTD)	4	2866	13,487	18,577
103	0604670D8Z	Human, Social and Culture Behavior Modeling (HSBC) Advance Development	4	989	5,958	7,006
104	0604787D8Z	Joint Systems Integration Command (JSIC)	4	18729	19,535	19,744
105	0604828D8Z	Joint Fires Integration & Interoperability Team	4	15969	16,813	16,972
106	0605017D8Z	Reduction of Total Ownership Cost	4	23685	24,359	24,647
107	0303191D8Z	Joint Electromagnetic Technology (JET) Program	4	9157	5,494	3,949
		Subtotal B/A 4		**246,976**	**274,551**	**298,567**
		ENGINEERING MANUF. DEV.				
108	0604051D8Z	Defense Acquisition Challenge Program	5	28,188	28,409	28,862
109	0604161D8Z	Nuclear & Conventional Physical Security Equipment RDT&E SDD	5	3,162	4,331	7,628
110	0604165D8Z	Prompt Global Strike	5	96,391	74,163	166,913
112	0604709D8Z	Joint Robotics Program	5	6,710	5,694	5,127
114	0604771D8Z	Joint Tactical Information Distribution System (JTIDS)	5	16,893	20,487	20,633
120	0605027D8Z	OUSD(C) IT Development Initiatives	5			5,000
121	0605140D8Z	Trusted Foundry	5	41,306	42,127	41,223
122	0605648D8Z	Defense Acquisition Executive (DAE) Pilot Program	5	5,655	5,851	4,267
125	00807708D8Z	Wounded Ill and Injured Senior Oversight Commettee (WII-SOC) Staff Office	5			1,609
		Subtotal B/A 5		**198,305**	**181,062**	**281,262**
		MANAGEMENT SUPPORT				
126	0603757D8Z	Training Transformation T2	6	55682	58,009	0
127	0604774D8Z	Defense Readiness Reporting System (DRRS)	6	11760	11,322	13,121
128	0604875D8Z	Joint Systems Architecture Development	6	23191	14,231	15,247
129	0604940D8Z	Central Test & Evaluation Investment Development (CTIEP)	6	144039	152,013	145,052
130	0604943D8Z	Thermal Vicar	6	9235	9,605	9,045
131	0605100D8Z	Joint Mission Environment Test Capability (JMETC)	6	6732	8,785	9,455
132	0605104D8Z	Technical Studies Support and Analysis	6	30199	36,319	44,760
133	0605110D8Z	USD (A&T) Critical Technology Support	6	3673	3,985	4,914
134	0605117D8Z	Foreign Materiel Acqusition & Exploitation	6	254121	62,471	94,921
136	0605128D8Z	Classified Program USD (P)	6	109452	101,440	0
137	0605130D8Z	Foreign Comparitive Testing	6	30811	34,718	35,054
138	0605161D8Z	Nuclear Matters - Physical security	6	4354	4,451	6,474
139	0605170D8Z	Support to Network and Information Integration	6	10725	14,642	14,916

R-1 Line No.	Program Element Number	Item	Budget Activity	FY 2008	FY 2009	FY2010
		MANAGEMENT SUPPORT				
140	0605200D8Z	General Support to USD (Intelligence)	6	43342	4,355	5,888
144	0605502D8Z	Small Business Innovative Research	6	50109	0	0
147	0605790D8Z	Small Business Innovative Research/Challenge Administration	6	2981	5,733	2,163
148	0605798D8Z	Defense Technology Analysis	6	11375	10,979	11,005
150	0605799D8Z	Force Transformation Directorate	6	19908	23,073	19,981
153	0605804D8Z	Development Test & Evaluation	6	17452	23,566	23,512
156	0606100D8Z	Budget and Program Assessments	6	1687	5,846	5,929
157	0606301D8Z	Aviation Safety Technologies	6			8,000
161	0303166D8Z	Support To Information Operations Capability	6	33,736	34,966	30,604
162	0303169D8Z	Information Technology Rapid Acquisition	6	5,315	5,225	4,667
164	0305193D8Z	Intelligence Support to Information Operations	6	9,826	17,528	20,648
166	0305400D8Z	Warfighting & Intelligence-Related Support	6	795	826	829
167	0804767D8Z	COCOM Exercise Engagement & Training Transformation (CE2T2)	6			34,306
		Subtotal B/A 6		**890,500**	**644,088**	**560,491**
		OPERATIONAL SYSTEMS DEVELOPMENT				
175	0607828D8Z	Joint Integration & Interoperability	7	52,214	49,100	46,214
193	0303140D8Z	Information Systems Security Program	7	15,125	13,386	13,477
201	0303260D8Z	Joint Military Deception Initiative	7			942
206	0305103D8Z	Cyber Security Initiative	7	0	994	993
209	0305125D8Z	Critical Infrastructure Protection	7	13,265	17,802	12,725
215	0305186D8Z	Policy R&D Programs	7	13,590	8,192	6,948
217	0305199D8Z	Net Centricity	7	9,856	12,647	1,479
228	0305387D8Z	Homeland Defense Technology Transfer Program	7	0	0	2,963
229	0305600D8Z	International Intelligence Tech Assessment, Advancement & Integration	7			1,389
241	1001018D8Z	NATO AGS	7	16,150	27,274	74,485
		Subtotal B/A 7		**120,200**	**129,395**	**161,615**
		RDT&E Totals		**2,692,906**	**2,587,551**	**2,653,713**

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601111D8Z Government/Industry Co-sponsorship of University Research

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	5.012	4.376	0.000						Continuing	Continuing
P111: Government/ Industry Co-sponsorship of University Research	5.012	4.376	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The FY 2009 Government/Industry Co-sponsorship of University Research (GICUR) program reflects three Congressional adds, they are:

1. Research of Chemical and Biological Warfare Agents $0.800 - Sponsor Rep Rangel (NY)
2. Shock Trauma Research Center $2.000 - Sponsor Rep Cleaver (MO)
3. Integrated Cryo-cooled High Power Density Systems $1.600 - Sponsor Sen Martinez (FL)

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	6.161	0.000	0.000	
Current BES/President's Budget	5.012	4.376		
Total Adjustments	-1.149	4.376		
Congressional Program Reductions				
Congressional Rescissions		-0.024		
Total Congressional Increases		4.400		
Total Reprogrammings	-0.964			
SBIR/STTR Transfer	-0.172			
Undistributed reductions	-0.013			

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P111, **Integrated Cryo-cooled High Power Density Systems** Sponsor Senator Martinez (FL) - Executed by the Office of Naval Research. Recipient Florida State University College of Engineering.		1.600

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601111D8Z Government/Industry Co-sponsorship of University Research

Congressional Increase Details ($ in Millions)	**FY 2008**	**FY 2009**
Project: P111, **Research of Chemical and Biological Warfare Agents** Sponsor Representative Rangel (NY) - Executed by the Army Research Center. Recipient New York Structural Biology Center .		0.800
Project: P111, **Shock Trauma Research Center** Sponsor Representative Cleaver (MO). Executed by the Army Medical Research and Material Command. Recipient University of Missouri.		2.000

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research				**R-1 ITEM NOMENCLATURE** PE 0601111D8Z Government/Industry Co-sponsorship of University Research					**PROJECT NUMBER** P111	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P111: Government/ Industry Co-sponsorship of University Research	5.012	4.376	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The FY 2008 Government/Industry Co-sponsorship of University Research (GICUR) program reflects four Congressional adds, they are:

1. Nanotechnology Initiative at Shaw University ($.990 million). Sponsor Rep Etheridge (NC)
2. New York Structural Biology Center ($1.590 million). Sponsors Rep Rangel, Senators Clinton and Schumer (NY)
3. Integrated Cryo-cooled High Power Density Systems ($1.590 million). Sponsor Rep Boyd (FL)
4. High Power Densities Research ($1.991 million). Senator Martinez (FL)

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
High Power Densities Research. Senator Martinez (FL) *FY 2008 Accomplishments:* Executed the congressional add as directed by Congress. Recipient Florida State University College of Engineering.	1.400	0.000	0.000	
Integrated Cryo-cooled High Power Density Systems. Sponsor Rep Boyd (FL) *FY 2008 Accomplishments:* Executed the congressional add as directed by Congress. Recipient Florida State University College of Engineering. *FY 2009 Plans:* Continue to execute the congressional add as directed by Congress. Recipient Florida State University College of Engineering.	1.190	1.588	0.000	
Nanotechnology Initiative at Shaw University (NC)	0.964	0.000	0.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601111D8Z Government/Industry Co-sponsorship of University Research	**PROJECT NUMBER** P111

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Executed the congressional add as directed by Congress. Transferred to SOCOM.				
New York Structural Biology Center. Sponsors Rep Rangel, Senators Clinton and Schumer (NY) *FY 2008 Accomplishments:* Execute the congressional add as directed by Congress.	1.458	0.000	0.000	
Research of Chemical and Biological Warfare Agents *FY 2009 Plans:* New York Structural Biology Center for chemical-biological research to characterize the molecular structures of chemical and biological warfare agents and develop effective countermeasures for military and civilian use.	0.000	0.800	0.000	
Shock Trauma Research Center *FY 2009 Plans:* University of Missouri for Shock Trauma research.	0.000	1.988	0.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601114D8Z Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	19.894	14.752	0.000						Continuing	Continuing
P114: Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)	19.894	14.752	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Defense Experimental Program to Stimulate Competitive Research (DEPSCoR) is a legislated program that funds research activities in science and engineering fields at institutions of higher education in selected states. DEPSCoR was intended to expand research opportunities in states that traditionally received the least funding in federal support for university research.

Participation in this program is limited to states that meet eligibility criteria as set forth in the authorizing language. The program improves the capabilities of institutions of higher education to develop, plan, and execute science and engineering research that is competitive under a peer-review system. Educational institutions in eligible DEPSCoR states are invited to compete for research/infrastructure awards in areas identified by the department in Broad Agency Announcements published by the Services.

Section 239 of the FY 2008 Authorization Conference Report directs the Secretary of Defense to utilize a defense federally funded research and development center to carry out an assessment of the DEPSCoR program. The assessment is due no later than nine months after the date of the enactment of this Act (October 2008). The Institute for Defense Analyses (IDA) conducted the DEPSCoR assessment. The report went to Congress December 24, 2008.

FY 2009 DEPSCoR Program - 23 States Eligible to compete. The FY 2009 program eliminated the EPSCoR State Committees Review Requirements. Solicitation posted by the Army Research Office on March 6, 2009. Proposals are due on May 4, 2009. The FY 2009 broad agency announcement will fund the $12.000 congressional increase.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601114D8Z Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	16.931	2.833		
Current BES/President's Budget	19.894	14.752		
Total Adjustments	2.963	11.919		
Congressional Program Reductions				
Congressional Rescissions		-0.081		
Total Congressional Increases		12.000		
Total Reprogrammings	3.474			
SBIR/STTR Transfer	-0.474			
Undistributed Reduction	-0.037			

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P114, **Program Enhancement**		12.000

Change Summary Explanation

The FY 2009 DEPSCoR Program received a congressional increase in the amount of $12.0 million.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research				**R-1 ITEM NOMENCLATURE** PE 0601114D8Z Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)					**PROJECT NUMBER** P114	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P114: Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)	19.894	14.752	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Defense Experimental Program to Stimulate Competitive Research (DEPSCoR) is a legislated program that funds research activities in science and engineering fields at institutions of higher education in selected states. DEPSCoR was intended to expand research opportunities in states that traditionally received the least funding in federal support for university research.

(U) Participation in this program is limited to states that meet eligibility criteria as set forth in the authorizing language. The program improves the capabilities of institutions of higher education to develop, plan, and execute science and engineering research that is competitive under a peer-review system. Educational institutions in eligible DEPSCoR states are invited to compete for research/infrastructure awards in areas identified by the department in Broad Agency Announcements regularly published by the Services. The DEPSCoR FY 2008 BAA closed on October 26, 2007. The FY 2008 DEPSCoR News Release published on March 26, 2008 announcement 24 research grants totaling $15.7 million. The Army Research Office, the Office of Naval Research, and the Air Force Office of Scientific Research will execute the awards.

(U) Section 239 of the FY 2008 Authorization Conference Report directs the Secretary of Defense to utilize a defense federally funded research and development center to carry out an assessment of the DEPSCoR program. The assessment is due no later than nine months after the date of the enactment of this Act (October 2008). The Institute for Defense Analyses (IDA) conducted the DEPSCoR assessment. The report went to Congress December 24, 2008.

FY 2009 DEPSCoR Program - 23 States Eligible to compete. The FY 2009 program eliminated the EPSCoR State Committees Review Requirements. Solicitation posted by the Army Research Office on March 6, 2009. Proposals are due on May 4, 2009. The FY 2009 broad agency announcement will fund the $12.000 congressional increase.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Defense Experimental Program to Stimulate Competitive Research (DEPSCoR)	19.894	14.752	0.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601114D8Z Defense Experimental Program to Stimulate Competitive Research (DEPSCOR)	**PROJECT NUMBER** P114

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Awarded 24 grants to academic institutions in 18 states to perform research in science and engineering fields. Proposals were competitively selected by the Air Force Office of Scientific Research, the Army Research Office, and the Office of Naval Research Average award: $0.655 thousand each (total over the three year grant period). *FY 2009 Plans:* The FY 2009 Broad Area Announcement (BAA) is in the review process with the Services. Solicitation posted by the Army Research Office on March 6, 2009. Proposals are due on May 4, 2009. The FY 2009 broad agency announcement will fund the $12.000 congressional increase. *FY 2010 Plans:* The Department of Defense requested no funds for DEPSCoR in fiscal year 2010 and in future year budget requests.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	42.447	69.093	89.980						Continuing	Continuing
P120: National Defense Education Program (NDEP)	42.447	69.093	89.980						Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Defense Education Program (NDEP) pre-engineering and higher education initiatives are ensuring the engagement and development of high-quality talent that possess superior science, technology, engineering and mathematics (STEM) skills and abilities for the greatest impact. NDEP supports the building of STEM talent and investment in world-leading basic research. Pre-engineering middle and high school STEM teachers receive inquiry-based training and are partnered with DoD laboratory scientists and engineers. Undergraduate and graduate students are supported in STEM disciplines, trained in the DoD laboratories, and transitioned into the DoD workforce. Under NDEP, approximately ten distinguished university faculty are selected annually to be supported in their world-class research and establish strategic partnerships among the researchers and DoD personnel and organizations.

Since the program's inception in 2006, the NDEP pre-engineering initiatives resulted in 425 teachers trained, the development of several summer teacher skill-building institutes, and the establishment of partnerships between laboratory scientists and engineers with middle and high school classroom teachers in 12 states. Additionally, 16 "LabTV" webisodes that feature laboratory personnel and DoD technology were developed for the public.

NDEP higher education initiatives also supported and trained over 350 undergraduate and graduate students earning bachelor's, master's and Ph.D degrees in STEM disciplines at very high and high research universities. Nearly 150 students will have transitioned into the DoD laboratory and components workforce by year's end. To date, eighteen highly distinguished university researchers have been selected from over 800 eligible applicants. Among these researchers are members of the National Academy of Science, the National Academy of Engineering, and recipients of prestigious science awards.

Current research and education awards will be sustained and increased in FY 2010. Final selection of FY 2010 NDEP new start projects will be determined in September 2009.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	43.988	68.972	91.484	
Current BES/President's Budget	42.447	69.093	89.980	
Total Adjustments	-1.541	0.121	-1.504	
Congressional Program Reductions				
Congressional Rescissions		-0.379		
Total Congressional Increases				
Total Reprogrammings	-0.250	0.500		
SBIR/STTR Transfer	-1.195			
Undistributed Reductions	-0.096			
Program Adjustment			-0.457	
Other			-1.047	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research				**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)					**PROJECT NUMBER** P120	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P120: National Defense Education Program (NDEP)	42.447	69.093	89.980						Continuing	Continuing

A. Mission Description and Budget Item Justification

The National Defense Education Program (NDEP) pre-engineering and higher education initiatives are ensuring the engagement and development of high-quality talent that possess superior science, technology, engineering and mathematics (STEM) skills and abilities for the the greatest impact. NDEP supports the building of STEM talent and investment in world-leading basic research. Pre-engineering middle and high school STEM teachers receive inquiry-based training and are partnered with DoD laboratory scientists and engineers. Undergraduate and graduate students are supported in STEM disciplines, trained in the DoD laboratories, and transitioned into the DoD workforce. Under NDEP, approximately ten distinguished university faculty are selected annually to be supported in their world-leading research and establish strategic partnerships among the researchers and DoD personnel and organizations.

Since the program's inception in 2006, the NDEP pre-engineering initiatives resulted in 425 teachers trained, the development of several summer teacher skill-building institutes, and the establishment of partnerships between laboratory scientists and engineers with middle and high school classroom teachers in 12 states. Additionally, 16 "LabTV" webisodes that feature laboratory personnel and DoD technology were developed for the public.

NDEP higher education initiatives also supported and trained over 350 undergraduate and graduate students earning bachelor's, master's and Ph.D degrees in STEM disciplines at very high and high research universities. Nearly 150 students will have transitioned into the DoD laboratory and components workforce by year's end. To date, eighteen highly distinguished university researchers have been selected from over 800 eligible applicants. Among these researchers are members of the National Academy of Science, the National Academy of Engineering, and recipients of prestigious science awards.

Current research and education awards will be sustained and increased in FY 2010. Final selection of FY 2010 NDEP new start projects will be determined in September 2009.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Science, Mathematics and Research for Transformation (SMART) Defense Education Program	25.047	27.693	37.000	
The Science, Mathematics and Research for Transformation (SMART) Defense Education Program awards undergraduate scholarships and graduate fellowships to current and future scientists and				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)	**PROJECT NUMBER** P120

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
engineers in areas of importance to DoD. Participants are required to obtain security clearances and agree to a year of DoD employment in return for each year of academic support received. Through research experiences at DoD labs, SMART scholars gain additional skills and expertise that are directly applicable to mission needs. NDEP higher education initiatives also supported and trained over 350 undergraduate and graduate students earning bachelor's, master's and Ph.D degrees in STEM disciplines at very high and high research universities. Nearly 150 students will have transitioned into the DoD laboratory and components workforce by year's end. *FY 2008 Accomplishments:* To date, the total SMART awards (Title 10, USC 2192a) are ~350 and ~50 have transitioned into the DoD workforce. Reviewed 1,500 SMART applications using 100 DoD S&Es and university faculty reviewers. Over 800 students were eligible for award. Approximately 200 new awards were made. As one example, Air Force selected nearly 80 SMART applicants. More students were supported at the bachelor's degree level and nearly 60 new Ph.D. and over 40 master's students were also supported. Slightly more than 100 engineers were selected. Overall GPA of new awards increased to 3.71. Increased the number of DoD sites participating in SMART to 50. Revised service agreements based on feedback. Annual program review was conducted. *FY 2009 Plans:* Make 200 new undergraduate and graduate awards. Increase the number of DoD sites participating in SMART. Conduct an annual program review to include external reviewers. Develop management information system. Develop annual plan and report. Conduct site visits. Obtain feedback from transitioned SMART participants. Develop schedule for a third-party program evaluation. Transition approximately 100 SMART participants to the DoD workforce. *FY 2010 Plans:* Make 200 new undergraduate and graduate awards. Increase the number of eligible applications received from students from under-represented groups. Increase the number of reviewers from under-				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	R-1 ITEM NOMENCLATURE PE 0601120D8Z National Defense Education Program (NDEP)	PROJECT NUMBER P120

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
represented groups. Conduct a program evaluation. Transition 100 SMART graduates to the DoD workforce. Conduct a program review to include external reviewers.				
Pre-Engineering Program (PEP)	10.000	15.000	16.000	
Since the program's inception in 2006, the NDEP pre-engineering initiatives resulted in 425 teachers trained, the development of several summer teacher skill-building institutes, and the establishment of partnerships between laboratory scientists and engineers with middle and high school classroom teachers in 12 states. Additionally, 16 "LabTV" webisodes that feature laboratory personnel and DoD technology were developed for the public. PEP partnerships were developed in 12 states in FY 2008, 16 states in FY 2009, and 20 states in FY 2010. *FY 2008 Accomplishments:* Classroom-based activities spanned 12 states and reached 425 teachers in 208 schools across 68 school districts. At least 85 defense S&E's have participated and 21,258 students have been reached. There were at least 69 individual NDEP-supported K-12 events. Conducted an assessment of DoD S&E and teacher classroom-based STEM collaboration conducted in the Harford County school system. Conducted 3 one-week Summer Institute professional development training sessions on inquiry-based learning for 72 teachers and 12 defense S&E's. Increased partnerships with internal DoD and external partners to improve educational program efficiencies and effectiveness. Three formal partnerships were initiated within DoD: the DoD Education Activity (DoDEA), OSD (Advanced Systems and Concepts) and OSD (Reserve Affairs). 10 top tier U.S. high school students supported to conduct research experiences through the Research Science Institute (RSI) at MIT. Developed and launched an informal learning educational website to stimulate student and teacher interest in DoD science and technology challenges and DoD laboratory careers in science and engineering (www.ndep.us). Created weekly LabTV episodes for middle and high school audiences that brings DoD technology and scientists and engineers into the classroom.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)	**PROJECT NUMBER** P120

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Distributed 7,500 MATHCOUNTS "Club Kits" to participating U.S. middle schools to build math interest and skills. Sponsored 700 middle and high school students and their teacher sponsors participating in Team America Rocketry Challenge (TARC) national competition. Selected 6 teacher sponsors to participate in inquiry-based professional development Summer Institute with DoD S&Es. An electronic newsletter, STARLink, was initiated to bring topics of mutual interest to pre-college teachers and administrators and DoD laboratory scientists and engineers. Three issues were circulated to more than 2,500 DoD S&E employees and pre-college teachers and administrators . Increased partnerships with DoD laboratory S&Es and science and math pre-college educators in four States: Alabama, Hawaii, New York and South Carolina. Developed a computer-based mathematics learning module curriculum (Tabula Digita) to increase middle school math skills. A training program was developed and a series of teacher-S&E training workshops were conducted in Pennsylvania, Florida, New Jersey and California. Received two program awards: (1) "Programs That Work" presented to the Navy for it's pilot demonstration implementation in Dahlgren, VA sponsored by the Virginia Mathematics & Science Coalition; and (2) "Outstanding Contributions in Science Education" presented by the San Diego Science Educators Association for hosting a series of local teacher and DoD S&E workshops. *FY 2009 Plans:* Increase number of PEP partnerships between DoD S&E laboratory personnel and pre-college local schools in defense laboratory communities in Ohio, Massachusetts, Mississippi, and Rhode Island. Support 10 top-tier U.S. high school students' RSI summer research experience at MIT in areas of importance to DoD. Increase MATHCOUNTS teams in local schools in defense laboratory communities and provide MATHCOUNTS "Club Kits" to middle schools. Assess PEP learning modules and implementation approach. Support 700 middle and high school students and their teacher sponsors participating in Team America Rocketry Challenge (TARC) national competition. Select 4 teachers to participate in inquiry-based professional development Summer Institute with DoD S&Es.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)	**PROJECT NUMBER** P120

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Increase LabTV webisodes that feature DoD S&Es and technology to stimulate interest to middle and high school audiences. Develop supplemental learning material to accompany LabTV webisodes. Increase teacher professional development training with DoD S&Es. Contribute to DoD STEM Education Strategic Plan goals and objectives. *FY 2010 Plans:* Increase PEP partnerships between DoD S&Es and local schools in defense laboratory communities in 4 additional States. Expand and balance partnerships with STEM stakeholders in a coordinated effort on STEM education at the middle and high school level in defense laboratory communities. Contribute to DoD STEM Education Strategic Plan goals and objectives.				
National Security Science and Engineering Faculty Fellowship (NSSEFF)	7.400	26.400	36.980	
Fellowship awards are up to $600K annually in direct research costs for up to five consecutive years. In FY 2008, NSSEFF supported eight world-leading researchers and will add up to ten more each year. By FY 2012, NSSEFF will support a steady state of up to 50 researchers and engage, without additional funding, at least double that number of graduate students and post-docs. *FY 2008 Accomplishments:* Nearly 100 DoD S&Es reviewed 350 eligible white papers. The following eight basic research awards were funded: Exploring Dissimiliar and Nano Materials Integration as a Platform for New MWIR Device Functionality; Engineering Proteins for Viral Applications; Functional 1-D Structures Based Upon On-Wire Lithography (OWL); Fusion and Inference from Multiple and Massive Disparate Data Sources; Managing Acoustic Communications in High-Stress Settings; High Strain Actuators for Miniaturized Actuators and Self-Powered Sensors; Nanostructured Materials for Low Power, Low Weight, High Performance Electronic and Optoelectronic Devices; and Development of High Power Ultrafast Lasers and Applications in Hyperspectral Imaging and Nanotechnology. Developed lessons learned document on review process. *FY 2009 Plans:* Nearly 100 DoD S&Es reviewed ~470 eligible white papers. Ten basic research awards funded to distinguished university faculty. Develop NSSEFF Fellows strategic partnership plan that includes DoD				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 1 - Basic Research	**R-1 ITEM NOMENCLATURE** PE 0601120D8Z National Defense Education Program (NDEP)	**PROJECT NUMBER** P120

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
NSSEFF Conference to introduce Fellows to DoD community and NSSEFF Fellows' visits to ARL, NRL and AFRL. Review and report on NSSEFF Fellows' annual progress. Develop MoU between DDR&E and AFOSR naming AFOSR as executive administrator of NSSEFF. *FY 2010 Plans:* Monitor and support AFOSR activities to administer NSSEFF. Review NSSEFF Fellows' annual progress. Participate in AFOSR annual NSSEFF program review.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance Metrics within the National Defense Education Program:
1) Award 250 SMART scholarships
2) Demonstrate DoD PEP education initiatives in 20 states

Attract students at elementary, middle, and high school levels to pursue careers in science and engineering: A DoD outreach program has been established within NDEP. The Pre-Engineering Program initiative addresses this outreach requirement.

National Defense Education Program: Funding to support National Security Science and Engineering Faculty Fellowships and Science, Mathematics and Research for Transformation scholarship initiatives.

Ensure grant and fellowship programs are providing maximum benefit to DoD and the taxpayer: Reviews of the NDEP scholarship and fellowship programs continue. Modifications and enhancements to initiatives are being made as a result of participant feedback and program reviews.

Conduct annual program review. Monitor placement and performance of scholars and fellows. Identify any need for programmatic adjustments to maximize program benefits.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	12.152	15.171	22.669						Continuing	Continuing
P000: Insensitive Munitions	12.152	15.171	15.112						Continuing	Continuing
P204: Enabling Fuze Technology	0.000	0.000	7.557						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 joint enabling technologies that can be used by the Services as they develop their specific weapon programs. The program invests in technologies from a Joint Service perspective thus ensuring the development of technology with the broadest applicability, while avoiding duplication of efforts.

Under the Joint Insensitive Munitions (IM) Technology Program (JIMTP), investments are focused on specific munition areas that have been identified by the S&T community and validated by the technology needs identified in the IM Strategic Plans submitted by the Program Executive Officers (PEOs). These five munitions areas are: 1) high performance rocket propulsion, 2) minimum smoke rocket propulsion, 3) large caliber gun propulsion, 4) anti-armor warheads, and 5) blast and fragmentation warheads.

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 will be 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 Weapon Fuzing, 3) High Reliability Fuzing, 4) and Enabling Fuze Technologies and Common Architecture2.

Munition Area Technology Groups (MATGs) and Fuze Area Technology Groups (FATGs) have been established for each munitions and capability area and are tasked with 1) coordinating, establishing, and maintaining five-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 IM Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The JIMTP and JFTP will utilize a Technical Advisory Committee (TAC) (consisting of senior DoD and DOE laboratory representatives and senior Munitions PEO representatives) to provide program oversight, policy, direction and priorities during its annual meeting.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	12.433	15.254	15.371	
Current BES/President's Budget	12.152	15.171	22.669	
Total Adjustments	-0.281	-0.083	7.298	
Congressional Program Reductions				
Congressional Rescissions		-0.083		
Total Congressional Increases				
Total Reprogrammings	-0.200			
SBIR/STTR Transfer	-0.053			
Undistributed Reductions	-0.028			
Program Adjustment			-0.077	
Other			-0.275	
New project initiated			7.650	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology					**PROJECT NUMBER** P000	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P000: Insensitive Munitions	12.152	15.171	15.112						Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort is aimed at developing the enabling technologies needed to build weapons in compliance with Insensitive Munitions (IM) requirements established in statute (United States Code, Title 10, Chapter 141, Section 2389) and regulation (DoDI 5000.1 and CJCSI 3170.01F). Using technology available today, the Department has incrementally improved the IM response of our current munitions. New munitions which have fully implemented current IM technology and design practices have been able to achieve IM compliance. However, these have been the most easily solved problems. Without new technology, future variants of current weapon systems will have the same, or worse, response to IM stimuli (i.e., they will not improve with the technology available today). New weapon developments will face similar challenges.

Under the Joint Insensitive Munitions Program (JIMTP), investments are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups (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 DoD IM Strategic Plan. The program is structured around these five areas with clear cross-cutting tasks.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Insensitive Munitions (IM)	12.152	15.171	15.112	
This RDT&E effort is aimed at developing the enabling technologies needed to build weapons in compliance with Insensitive Munitions (IM) requirements established in statute (United States Code, Title 10, Chapter 141, Section 2389) and regulation (DoDI 5000.1 and CJCSI 3170.01F). Using technology available today, the Department has incrementally improved the IM response of our current munitions. New munitions which have fully implemented current IM technology and design practices have been able to achieve IM compliance. However, these have been the most easily solved problems. Without new technology, future variants of current weapon systems will have the same, or worse, response to IM stimuli (i.e., they will not improve with the technology available today). New weapon developments will face similar challenges.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology	**PROJECT NUMBER** P000

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Under the Joint Insensitive Munitions Program (JIMTP), investments are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups (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 DoD IM Strategic Plan. The program is structured around these five areas with clear cross-cutting tasks. *FY 2008 Accomplishments:* In FY 2008, the program remained focused on the five munition areas: (1) High Performance Rocket Propulsion: Demonstrated and transitioned new high-performance composite propellant with improved mechanical properties and sensitivity to 6.3 rocket motor program. Demonstrated in laboratory tests a new binder that may permit high-performance propellants to extinguish in a hazard scenario. Began synthesis of perbromate salts in order to evaluate their effect on composite propellant cook-off behavior. (2) Minimum Signature Rocket Propulsion: Fabricated hardware and demonstrated venting technology concepts in laboratory environment. Laboratory shock sensitivity results conducted and show reduced sensitivity for new minimum signature propellants (3) Blast and Fragmentation Warheads: Demonstrated and transitioned to a 6.3 program reactive liners for improved IM behavior in GP bombs. Developed and conducted successful lab tests for a new cast-cure formulation that shows large improvements in shock sensitivity and has projected performance suitable for large missile warheads. New eutectic-based explosive developed that show improved sensitivity and the performance required for artillery and mortars. New higher performance melt-cast explosive ingredient demonstrated to have less-sensitivity in lab tests and an improved synthesis route discovered. Possible eutectic formulations identified and begun for use of 1-amino-3-methyl-1,2,3-triazolium nitrate (AMTN) ionic liquid to gain reduced sensitivity; improved AMTN synthesis approach demonstrated in sub-scale. (4) Anti-Armor Warheads: Produced sufficient quantity of material for laboratory evaluation of new high-energy explosive using high-density waxes. Formulation and ingredient studies indicating, at lab scale, potential paths for reduced sensitivity explosives. Warhead liner venting transitioned from service tech-				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602000D8Z Joint Munitions Technology	PROJECT NUMBER P000

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
base to demonstration project. Evaluated explosive binder effects on laboratory-scale cook-off tests; some new binders appear to show improvement. (5) Large Caliber Gun Propulsion: Multiple gun propellant formulation approaches evaluated in laboratory scale; some ingredients and formulation approaches shown in lab tests to have improved sensitivity. Study of new ingredients and formulation approaches started for new gun propulsion primers for reduced sensitivity propellants. (6) Multi-area: Evaluated multiple approaches to coat sensitive nitramine explosive ingredients with less sensitive materials; down-selected HMX-NTO as promising combination and refined processing parameters for crystallization. Initiation evaluation and design of system for initiating extremely insensitive detonating substances. New synthesis approaches developed for LLM-105, an explosive for use in new booster formulations for use with low sensitivity explosives. *FY 2009 Plans:* (1) High Performance Rocket Propulsion: Scale-up and evaluate less extinguishable propellant formulations in lab-scale tests. Complete synthesis of perbromate salts and transition to 6.2 formulation effort. (2) Minimum Signature Rocket Propulsion: Scale-up and assess less sensitive propellants in laboratory tests (aging, performance, sensitivity). Prepare pint mixes of propellant formulations using ANAzF to assess hydrogen bonding affects on sensitivity. Begin study of binding agents to improve properties and reduce sensitivity in minimum signature propellants. (3) Blast and Fragmentation Warheads Scale-up formulation with missile-warhead performance and reduced sensitivity. Complete aging study on first generation of eutectic based-insensitive explosives. Begin development of general purpose bomb main-charge explosive formulations and begin assessment in laboratory environment. (4) Anti-Armor Warheads: Assess additional emerging binder approaches for use in anti-armor IM warheads. Initial formulation development of less-sensitive combined effects explosives. (5) Large Caliber Gun Propulsion: Down-select propellant formulation approach and begin phase II evaluation of sensitivity in laboratory environment. Medium caliber demonstration of concepts for reduced sensitivity primers. For large-caliber gun propulsion cook-off, conduct instrumented ballistic simulator tests and begin modification of required modeling and simulation tools. (6) Multi-area: Transition rocket motor venting concepts to 6.3 demonstration effort. Additional scale-up and synthesis studies of LLM-105. Begin formulation and synthesis work for new booster ingredient, Diaminoazoxy furazan (DAAF).				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology	**PROJECT NUMBER** P000

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Scale-up/transition energetic formulations and technologies to BA6.3 activities. Transition additional rocket motor venting concepts. Continue development of extinguishable high performance rocket propellants. Transition initial main-charge bomb fills for use in 6.3 demonstrations. Complete evaluation and transition initial reduced sensitivity minimum signature formulation. Transition down-selected binders to explosive formulation development efforts. Complete evaluation of booster formulations using less sensitive ingredients. Use emerging materials from FY2009 ingredient efforts in new formulations to address long term IM goals. Laboratory evaluation of flight termination technical approaches for use in IM improvements of large rocket motors. Thermal and network analysis for sensor approaches for use in fast cook-off mitigation of rocket motors. Begin development of new formulations using encapsulated materials for reduced sensitivity.				

C. Other Program Funding Summary ($ in Millions)

	FY 2008	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**Cost To Complete**	**Total Cost**
0603000D8Z P002/BA3 Insensitive Munitions Advanced Technology	3.941	9.915	20.428						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology					**PROJECT NUMBER** P204	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P204: Enabling Fuze Technology	0.000	0.000	7.557						Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort is aimed at developing the enabling technologies needed to provide the survivable and reliable fuzing capabilities based on needs identified in the Guidance for the Development of the Force and the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, June 19, 2008. Fuze capability through technology advancements has generally lagged the advancements made in U.S. weapons. Particularly, shortfalls have developed in the areas of: integration with advanced weapons, miniaturization, harsh environment survivability and functionality, and smart electronics and processing. Without new technology future weapon systems, as well as current weapon systems, will fail to meet the survivability and reliability needs of the warfighter.

Under the Joint Fuze Technology Program (JFTP), investments are focused in four capability areas: Hard Target Survivable Fuzing, Tailorable Effects Weapon Fuzing, High Reliability Fuzing, and Enabling Fuze Technologies and Common Architecture. Fuze Area Technology Groups (FATGs) under tri-Service leadership are developing technology roadmaps for each capability area which will be used to guide investments based on goals consistent with the strategic guidance of the Department and shortfalls in existing weapon systems.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Enabling Fuze Technology	0.000	0.000	7.557	
This RDT&E effort is aimed at developing the enabling technologies needed to provide the survivable and reliable fuzing capabilities based on needs identified in the Guidance for the Development of the Force and the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, June 19, 2008. Fuze capability through technology advancements has generally lagged the advancements made in U.S. weapons. Particularly, shortfalls have developed in the areas of: integration with advanced weapons, miniaturization, harsh environment survivability and functionality, and smart electronics and processing. Without new technology future weapon systems, as well as current weapon systems, will fail to meet the survivability and reliability needs of the warfighter.				
FY 2010 Plans: (Hard Target Fuzing) Develop systems based modeling and simulation tool to determine fuze response to the weapon Dynamics. Develop solid mechanics modeling and simulation technology to provide accurate				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602000D8Z Joint Munitions Technology	**PROJECT NUMBER** P204

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
material properties. (Tailorable Effects Fuze) Begin development of tailorable initiation technologies including a) multi-point plug-n-play, b) lower energy detonators/initiators and c) miniaturized explosive trains and d) multi-point initiation using energetic tracks, traces or deposition. (High Reliability Fuzing) Begin research, development and demonstration of MEMS device components and fabrication process development for cluster munitions fuze application. (Enabling Fuze Technologies) Begin development for new miniaturized smart fuze sensors and sensing modules for detecting impact, voids, media, and target proximity.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602227D8Z Medical Free Electron Laser

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	2.315	0.000	0.000						Continuing	Continuing
P483: Medical Free Electron Laser	2.315	0.000	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Funding for the Medical Free Electron Laser (MFEL) Program was terminated effective in FY 2008. Purpose of the program has been to develop advanced, laser-and optical-based applications for military medicine. Free electron lasers (FELs) provide unique pulse features and tunable wavelength characteristics that are unavailable in other laser devices. Thus, FELs facilitate the experimental options for the development of new laser-based medical technologies. This program has been focused on developing advanced procedures and equipment for rapid diagnosis and treatment of battlefield-related medical problems.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	2.385			
Current BES/President's Budget	2.315			
Total Adjustments	-0.070			
Congressional Program Reductions				
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.065			
Undistributed Reductions	-0.005			

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602227D8Z Medical Free Electron Laser					**PROJECT NUMBER** P483	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P483: Medical Free Electron Laser	2.315	0.000	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Funding for the Medical Free Electron Laser program was terminated effective in FY 2008. The purpose has been to develop advanced, laser-and optical-based applications for military medicine. Free electron lasers (FELs) provide unique pulse features and tunable wavelength characteristics that are unavailable in other laser devices. Thus, FELs facilitate the experimental options for the development of new laser-based medical technologies. This program has been focused on developing advanced procedures and equipment for rapid diagnosis and treatment of battlefield-related medical problems.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Medical Free Electron Laser	2.315	0.000	0.000	
FY 2008 Accomplishments: During FY 2008, funding was utilized to improve contrast and depth of Optical Coherence Tomography (OCT) imaging, investigate its use in burn and respiratory tract injury, and develop new ultra-small fiber optic endoscopy systems for general surgical use as well as other areas of potential applicability. Funding for the Medical Free Electron Laser (MFEL) Program was terminated effective in FY 2008.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	35.945	41.327	15.164						Continuing	Continuing
P489: Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	35.945	41.327	15.164						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) program provides support for research and collaboration with DoD facilities and personnel.

Research. 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 military laboratories or other universities.

Section 242 of the FY 2009 Authorization Report directs the Secretary of Defense to carry out an independent assessment of the DoD-wide HBCU/MI Programs. The assessment is due no later than 12 months after the enactment this of Act (October 2009). The National Academy of Sciences will conduct the independent assessment.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	37.463	15.156	15.426	
Current BES/President's Budget	35.945	41.327	15.164	
Total Adjustments	-1.518	26.171	-0.262	
Congressional Program Reductions				
Congressional Rescissions		-0.229		
Total Congressional Increases		26.400		
Total Reprogrammings	-0.386			
SBIR/STTR Transfer	-1.049			
Program Adjustment			-0.078	
Undistributed Reduction	-0.083			
Other			-0.184	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: P489, **Morehouse College, John Hopps Program**		1.600
Project: P489, **Defense Leadership and Technology Initiative**		2.400
Project: P489, **Program Increase**		20.000
Project: P489, **Instrumentation Program for Tribal Colleges** The FY 2009 Tribal Colleges and Universities congressional add for $2.400 million will be competed under 10 U.S.C. 2361 (b)(1)(C).		2.400

Change Summary Explanation

The FY 2009 HBCU/MI Program received a congressional increase in the amount of $20.000 million.
On 11/4/08, the U.S. Court of Appeals for the Federal Circuit found 10 U.S.C. 2323 to be unconstitutional.
- The case stems from a 1998 Air Force contract awarded to a minority owned firm despite another firm having bid lower. The other firm sued.
- While the case relates specifically to a small business preference authorized by 10 U.S.C. 2323, the court's decision goes to 10 U.S.C. 2323 in its entirety, which also includes:
-A goal to award 5 percent of extramural DoD funding to small disadvantaged businesses, HBCUs and minority institutions (MI)

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)

-Authorities to provide infrastructure assistance to HBCU/MI—e.g., through undergrad, graduate, and postdoctoral education programs; DoD lab partnerships with institutions for student training purposes; and equipment or laboratory renovation for defense research.
- The court decision took effect December 26th unless DoJ/DoD ask for reconsideration or file an appeal, in which case the court likely would extend that date.
- On February 26, 2009, in Rothe Development Corp. v. U.S. Department of Defense, et. al., No. SA-98-CA-1011-XR (W.D. TX), the court entered a final judgment granting Rothe's request for a complete injunction of the application of 10 U.S.C. 2323.
- On March 10, 2009 the USD(AT&L) signed a memorandum to all of DoD stating that "Accordingly, as preliminary guidance, effective February 26, 2009, any activity, which includes but is not limited to the award of contracts and orders under contracts, advance payments, and the award of grants or scholarships or the addition of funds to existing grants and scholarships, that rely exclusively on the authority of 10 U.S.C. 2323 should cease".
- The FY 2009 DoD HBCU/MI Program is on hold until DoD hears back from Congress and the DOJ on new legislation for the program to continue.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)					**PROJECT NUMBER** P489	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P489: Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	35.945	41.327	15.164						Continuing	Continuing

Note

The FY 2009 HBCU/MI Program received a congressional increase in the amount of $20.000 million.
On 11/4/08, the U.S. Court of Appeals for the Federal Circuit found 10 U.S.C. 2323 to be unconstitutional.
- The case stems from a 1998 Air Force contract awarded to a minority owned firm despite another firm having bid lower. The other firm sued.
- While the case relates specifically to a small business preference authorized by 10 U.S.C. 2323, the court's decision goes to 10 U.S.C. 2323 in its entirety, which also includes:
-A goal to award 5 percent of extramural DoD funding to small disadvantaged businesses, HBCUs and minority institutions (MI)
-Authorities to provide infrastructure assistance to HBCU/MI—e.g., through undergrad, graduate, and postdoctoral education programs; DoD lab partnerships with institutions for student training purposes; and equipment or laboratory renovation for defense research.
- The court decision took effect December 26th unless DoJ/DoD ask for reconsideration or file an appeal, in which case the court likely would extend that date.
- On February 26, 2009, in Rothe Development Corp. v. U.S. Department of Defense, et. al., No. SA-98-CA-1011-XR (W.D. TX), the court entered a final judgment granting Rothe's request for a complete injunction of the application of 10 U.S.C. 2323.
- On March 10, 2009 the USD(AT&L) signed a memorandum to all of DoD stating that "Accordingly, as preliminary guidance, effective February 26, 2009, any activity, which includes but is not limited to the award of contracts and orders under contracts, advance payments, and the award of grants or scholarships or the addition of funds to existing grants and scholarships, that rely exclusively on the authority of 10 U.S.C. 2323 should cease".
- The FY 2009 DoD HBCU/MI Program is on hold until DoD hears back from Congress and the DOJ on new legislation for the program to continue.

A. Mission Description and Budget Item Justification

The Historically Black Colleges and Universities and Minority Institutions (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 military laboratories or other universities.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	**PROJECT NUMBER** P489

Section 242 of the FY 2009 Authorization Report directs the Secretary of Defense to carry out an independent assessment of the DoD-wide HBCU/MI Programs. The assessment is due no later than 12 months after the enactment this Act (October 2009). The National Academy of Sciences will conduct the independent assessment.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	35.945	41.327	15.164	

The Historically Black Colleges and Universities and Minority Institutions (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 military laboratories or other universities.

FY 2008 Accomplishments:
This program funded 21 research awards to HBCUs and MIs and 13 equipment awards to TCUs totaling $2.400 million. The research grants have a performance period of 36 months with grants ranging from $0.430 to $0.785 million. The equipment grants are for a twelve-month performance period and range from $0.097 to $0.244 million. The Army Research Office made the awards. DoD announced results of the second HBCU/MI FY 2008 competition on March 30, 2008. Awards were made under 10 U.S.C. 2358 and 10 U.S.C. 2371. This announcement funded the $20.000 million congressional increase.

FY 2009 Plans:
Continue evaluation and funding of research and education awards made with prior year funds. Execute new funding for grants and awards following legislative and executive policy and guidance when Congress directs. Conduct an assessment of the HBCU/MI Program.

The FY 2009 Tribal Colleges and Universities congressional add for $2.400 million will be competed under 10 U.S.C. 2361 (b)(1)(C).

FY 2010 Plans:
Conduct BAAs and solicitations to execute funding for grants and awards following legislative and executive policy and guidance when Congress directs.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602228D8Z Historically Black Colleges and Universities and Minority Institutions (HBCU/MI)	**PROJECT NUMBER** P489

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Since 2007, the following data is collected as a grant requirement:
Percent of students graduating with undergraduate degrees in Science, Mathematics, Engineering, and Technology fields.
Percent of students pursuing graduate and Ph.D. degrees.
Number of undergraduate students achieving specified GPA average.
Number of students participating in the Centers of Excellence for Research and Engineering.
Number of students working in Defense Laboratories.
This data will constitute the "Existing Baseline" for measurement and improvement in future years. First results expected by May 2009.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602234D8Z Lincoln Laboratory

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	28.288	31.168	34.034						Continuing	Continuing
P534: Lincoln Laboratory	24.788	28.271	30.025						Continuing	Continuing
P535: Technical Intelligence	3.500	2.897	4.009						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Lincoln Laboratory research line program (LL 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, new technologies, and new components and materials. The LL Program contributed foundation technologies to two systems which received the 2002 Packard Excellence in Acquisition Award: (1) the Bio-aerosol sensing and micro-laser technologies were transferred to industry and are in production for the Joint Biological Defense Sensor (JBPDS), and (2) the Free-space optical communications technologies were used in the GeoLite optical communications satellite demonstration system.

(U) The LL Program currently has impact in five core technology thrusts:

(U) Advanced Electronics Technology, with emphasis on development of materials, devices, and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors.
(U) Advanced Optical Communications, focusing on extremely efficient, free space optical communications links.
(U) Advanced Sensors, including the development of novel active and passive radio frequency and electro-optic sensors.
(U) Sensor Networking and Decision Support, with an emphasis on developing an integrated set of advanced technologies to improve the collection and use of sensor data to support military decision making.
(U) Counter Terrorism Technologies, aimed at developing technologies useful in the global war on terror.

(U) Supporting these five core technology thrusts is a work effort titled Technical Intelligence. Technical Intelligence will support detailed understanding of technology advancement in important scientific area and other scientific disciplines such as nanotechnology, directed energy and propulsion. Some details are classified, but one effort, called Global Dialogue on Emerging Science and Technology will be jointly sponsored by DOD, Department of State, and CIA will give very detailed insight in such topics as Software Engineering in India, Nanotechnology in South East Asia, European Laser development, for example. This information will in turn assist in development of U.S. capabilities.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602234D8Z Lincoln Laboratory

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	29.269	31.340	31.954	
Current BES/President's Budget	28.288	31.168	34.034	
Total Adjustments	-0.981	-0.172	2.080	
Congressional Program Reductions				
Congressional Rescissions		-0.172		
Total Congressional Increases				
Total Reprogrammings	-0.113			
SBIR/STTR Transfer	-0.803			
Undistributed Reduction	-0.065			
Balance attributed to program budget review adjustments			2.493	
Other			-0.413	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602234D8Z Lincoln Laboratory					**PROJECT NUMBER** P534	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P534: Lincoln Laboratory	24.788	28.271	30.025						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The Lincoln Laboratory program (LL 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 advanced research activities that directly lead to the development of new system concepts, new technologies, and new components and materials, with impact in five core technology thrusts:

(U) Advanced Electronics Technology, with emphasis on development of materials, devices, and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors.
(U) Advanced Optical Communications, focusing on extremely efficient, free space optical communications links.
(U) Advanced Sensors, including the development of novel active and passive RF and electro-optic sensors.
(U) Sensor Networking and Decision Support, with an emphasis on developing an integrated a set of advanced technologies to improve the collection and use of sensor data to support military decision making.
(U) Counter Terrorism Technologies, aimed at developing technologies useful in the global war on terror.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Advanced Electronics Technology	6.374	7.436	7.823	
FY 2008 Accomplishments: (U) Developed prototype ultrasensitive photon-counting detector arrays, scaleable to large sensor fields of view, to enable a new class of ISR sensors. Developed improved photon counting detectors useable in the short-wave infrared region for remote sensing applications. Continued development efforts on semiconductor processes enabling tiled focal plane arrays for gigapixel cameras, useful for large field-of-view persistent surveillance systems. Developed new techniques for detecting and pre-empting terrorist activity, employing tagging, tracking, and locating technologies and miniaturized low-power, long endurance microsensors. Developed technologies for highly integrated RF front ends, including silicon-based transceivers for use in low-cost RF systems. Continued development of solid state and semiconductor laser illuminators for low-cost bioaerosol sensors. Developed high power, narrow band				

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602234D8Z Lincoln Laboratory	**PROJECT NUMBER** P534

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
laser to support multi-kilowatt laser beam combining. Continued efforts to transition technology to a wide range of DoD system demonstrations, and to industry for volume manufacturing. *FY 2009 Plans:* (U) Develop technologies for imaging focal planes which enable new approaches to Department of Defense electro-optical sensors. Develop unique integrated circuit designs and processes for ultra-low power electronics, high data collection rates, or operation in stressing environments. Develop technologies for highly integrated RF front ends, including silicon-based transceivers for use in low cost and reconfigurable RF systems. Continue development of solid state and semiconductor laser illuminators for active sensing and high power laser applications. *FY 2010 Plans:* (U) Continue technology development for imaging focal planes which enable new approaches to Department of Defense electro-optical sensors. Develop unique integrated circuit designs and processes for ultra-low power electronics, high data collection rates, or operation in stressing environments. Develop technologies for highly integrated RF front ends, including silicon-based transceivers for use in low cost and reconfigurable RF systems. Continue development of solid state and semiconductor laser illuminators for active sensing and high power laser applications.				
Advanced Optical Communications *FY 2008 Accomplishments:* (U) Developed a monolithic, single mode, laser diode array for low power laser communications applications. Demonstrated ultrasensitive, high speed photon-counting communications receiver in a laboratory experiment.	3.407	3.615	3.823	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: (U) Develop laser technologies to support agile beam communications concepts. Develop technologies to increase the data rate of ultra sensitive communications links. Develop advanced channel equalization techniques to allow wideband optical data transmission through scattering media. *FY 2010 Plans:* (U) Continue laser technology development to support agile beam communications concepts. Develop technologies to increase the data rate of ultra sensitive communications links. Develop advanced channel equalization techniques to allow wideband optical data transmission through scattering media.				
Advanced Sensors *FY 2008 Accomplishments:* (U) Completed design of low power Digital Focal Plane Array (DFPA) chip. Built and tested a portable, high resolution, wide field of view, infrared DFPA camera. Conducted coordinated target measurements involving a radar on one aircraft and a passive optical sensor and laser radar on a second aircraft. Improved the range resolution of the ultra-high-resolution laser radar. Identified multiple potential applications for 3D graph processor. Designed and fabricated a single chip, radar receiver with improved sensitivity and dynamic range. *FY 2009 Plans:* (U) Continue to improve sensitivity and data throughput rate of infrared digital focal plane array (DFPA) surveillance camera. Continue to investigate multiple input-multiple output (MIMO) radar architectures. Develop novel computer architectures designed specifically for rapidly processing data relevant to the Global War on Terrorism. *FY 2010 Plans:* (U) Continue technology development to improve sensitivity and data throughput rate of infrared digital focal plane array (DFPA) surveillance camera. Continue to investigate multiple input-multiple output (MIMO) radar architectures. Develop novel computer architectures designed specifically for rapidly processing data relevant to the Global War on Terrorism.	8.176	6.927	7.223	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Sensor Networking and Decision Support	3.159	5.195	4.931	
FY 2008 Accomplishments: (U) Used Intelligence, surveillance, and reconnaissance data from a computer-generated tactical scene and conducted an integrated laboratory decision-support demonstration. *FY 2009 Plans:* (U) Explore potential extension of low cost, networked chemical sensors to other distributed sensing applications. Pursue new approaches to chemical standoff sensing. Incorporate real-time processing and data links to allow cross-cueing among multiple sensor platforms. Demonstrate an integrated multi-source information /knowledge management architecture to provide decision support for the military. *FY 2010 Plans:* (U) Continue extension of low cost, networked chemical sensors to other distributed sensing applications. Pursue new approaches to chemical standoff sensing. Incorporate real-time processing and data links to allow cross-cueing among multiple sensor platforms. Demonstrate an integrated multi-source information /knowledge management architecture to provide decision support for the military.				
Counter Terrorism Technologies	3.672	5.098	6.225	
FY 2008 Accomplishments: (U) Evaluated a novel pathogen treatment in mice. Performed comparative testing of emerging chemical sensing technologies. Tested novel, early-warning perimeter chemical agent sensor at a remote site. Evaluated the utility of networked sensors for chemical and biological agent release detection and tracking. *FY 2009 Plans:* (U) Develop novel UAV sensing and wideband communications systems. Develop an architecture and system that employs a family of low cost, miniature, ground-based sensors. Develop automated software tools for terrorist threat network analysis and tracking.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: (U) Continue development of novel UAV sensing and wideband communications systems. Develop an architecture and system that employs a family of low cost, miniature, ground-based sensors. Develop automated software tools for terrorist threat network analysis and tracking.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P535: Technical Intelligence	3.500	2.897	4.009						Continuing	Continuing

A. Mission Description and Budget Item Justification

Technical Intelligence supports five core technology thrusts that combine efforts in two areas: 1) from the university community through the JASONs (this is not an acronym) program and 2) through information on maturation and development of technology throughout the rest of the world.

(U) JASONs is a group of approximately 50 appropriately cleared experts who provide detailed independent technical assessment of the most difficult technological problems. JASON members are mostly fully tenured professors in physics, mathematics, engineering, and hold active SCI-level clearances. Output from JASON studies are provided to levels up to the Secretary of Defense and their studies shape programmatic and technical decisions involving literally hundreds of millions of dollars. JASONs were previously funded through university research programs, but their level of technology maturity is appropriate for incorporation into Applied Research.

(U) The technical intelligence program will support collaborative work with the U.S. federal intelligence community on emerging and disruptive technologies, primarily through further development of the Science and Technology Net Assessment studies, which assess a select set of technologies from both a domestic and foreign development perspective. The program will also support focused technology and regional trend studies and collaborative work with international partner nations on assessments of emerging and disruptive technology and its application. The technical intelligence program will also support development of information technology based tools that enable collaborative analysis of emerging and disruptive technologies.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Technical Intelligence	3.500	2.897	4.009	
FY 2008 Accomplishments: (U) The JASON studies and Technical Intelligence are focused in areas critical to national security. JASON studies were focused depending on the area most important in the security environment. For the Technical Intelligence portion; Some details are classified. The program supported detailed understanding of technology advancement in collaboration with the National S&T Intelligence Committee in the area of quantum information science. Additionally the program investigates emerging technology trends and assesses implication; one effort tasked the commissioning of a National Academy of				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Sciences project under the National Research Council called Forecasting Future Disruptive Technology which investigated and published on methods for technology forecasting. This program provides very detailed insight in such topics as Information Technology, advancements in space technology, biotechnology applications for genetic engineering, meta-materials and an emerging area of study on energy technology. The program conducted a future technology war-game at the National Defense University, focused on the potential disruptive impact of commercially available technologies for increasing performance of warriors on the battlefield. Country specific reports on the science and technology sectors of specific countries were commissioned by the program with the library of congress federal research division (Four were completed in FY 2008: China, Israel, South Africa and Ukraine). An international project arrangement between the United States and Australia was finalized and international collaboration for the efforts were expanded to be tri-lateral with the United Kingdom on assessments of emerging and disruptive technology and its application. By funding and carefully targeting these opportunities, the DDR&E is able to better shape the Science & Technology (S&T) program.				
FY 2009 Plans: (U) Continue to focus the JASON studies and Technical Intelligence in areas critical to national security. JASON studies will be focused depending on the area most important in the security environment at the time. For the Technical Intelligence portion; Additional country specific S&T sector reports will be commissioned in by the Library of Congress Federal Research Division and finalized. In support of continued efforts to characterize technology trends and forecast the map of the future science and technology landscape this program will continue the National Academies project to forecast future disruptive technology and will sponsor several conferences in countries and technologies of interest. This program will participate in a tri-lateral arrangement with the United Kingdom and Australia to assess emerging and disruptive technology and will contribute to generation of tri-lateral research products on technology implications. The program will continue the effort of a National Academy of Sciences project under the National Research Council called Forecasting Future Disruptive Technology to identify national security impacts of forecasted technologies. In coordination with the National Intelligence Committee effort to Strengthen Science and Technology Analysis, this program will coordinate, and develop processes and mechanisms to integrate and coherently track defense S&T intelligence requirements				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and will conduct S&T net technical assessments in several areas such as energetic materials, micro-electronics, information assurance and neuroscience. *FY 2010 Plans:* (U) Continue to focus the JASON studies and Technical Intelligence in areas critical to national security. JASON studies will be focused depending on the area most important in the security environment at the time. For the Technical Intelligence portion; some details are classified. The program will conduct S&T net technical assessments on global technology advancement in collaboration with the National S&T Intelligence Committee in the areas such as electronic warfare, hypersonic aeronautics and others as identified by the S&T net assessment program in FY 2009. This program will continue tri-lateral collaboration with the United Kingdom and Australia to continue assessments on emerging and disruptive technology and will contribute to an international conference. The program will continue the effort of a National Academy of Sciences project under the National Research Council called Forecasting Future Disruptive Technology to identify national security impacts of forecasted technologies, will sponsor several conferences in countries and technologies of interest, and will conducted a future technology war-game at the National Defense University, focused on the potential disruptive impact of commercially available technologies. In coordination with the National Intelligence Committee and the Defense Intelligence Community effort to Strengthen Science and Technology Analysis, this program will initiate the implementation of a structured enterprise approach to determine, prioritize, track, distribute and evaluate S&T intelligence requirement and will generate a report on the health of Defense S&T Intelligence to support the defense S&T program. Country specific reports by the Library of Congress Federal Research Division commissioned in FY 2009 will be finalized, additional reports will be commissioned and the program will initiate development of Web 2.0 based information technology solutions geared to increase global technology awareness.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

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E. Performance Metrics

N/A

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602663D8Z Joint Data Management Research

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	4.940						Continuing	Continuing
P266: Joint Data Managment Research	0.000	0.000	4.940						Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new start program.

(U) As the Department of Defense increases the capability and capacity to generate increasing amounts of data from numerous sensors in the battlespace, the issue of handling very large data sets has become more challenging. This is in part due to Department of Defense response to a changing threat environment where there is an expansion of the types of sensors deployed, new types of information collected, and different features used to classify these new threats. From a technical perspective, sensor processing speeds have outpaced the speed and ability to transport, store and process the data created. Science and technology investigation into new and novel ways to manage and exploit this data is required to more efficiently use sensor assets and effectively use information in a timely fashion.

(U) This applied research program will explore ways to apply emerging mathematics and information sciences to improve machine processing of large amounts of data beyond simple data processing and information distillation. This level of automated processing must lead to a better understanding of the information presented at higher levels of decision making. As a part of this effort, the development of challenge problems will be established to define metrics in the way data and decision problems are solved (inference, prediction, analysis). The metrics, models and methods that result from this definitional work will be validated through warfighter and analyst demonstrations and experiments. Successful results will be measured in a reduced time to access information, reduced time to effect a decision, less information handling required, and redefining operational processes.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget			0.000	
Current BES/President's Budget			4.940	
Total Adjustments			4.940	
Congressional Program Reductions				
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer				
New Approved Program			5.000	
Other			-0.060	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research				**R-1 ITEM NOMENCLATURE** PE 0602663D8Z Joint Data Management Research					**PROJECT NUMBER** P266	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P266: Joint Data Managment Research	0.000	0.000	4.940						Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new start program.

(U) Data Shaping for Exploitation – When tracing the information processing chain from the sensor inputs to the user/analysts, the automated techniques that are known and can be applied become fewer and less mature. The simple information process chain goes from (1) data tagging to (2) pre-processing to (3) multi-source common data representation to (4) triage/identify high priority data subsets for analysis and action. Candidate research topics to be explored include pattern analysis, data classification for importance and prioritization, criticality assessment, change detection, uncertainty management and reduction, high level structures, data search and retrieval, feature extraction, automatic translation, and automated or assisted pattern recognition.

(U) Data Discovery for Exploitation – In order to better to discover and exploit the growing amount of sensor data, the following areas of research are considered: Object recognition in scenes and streams, discovery and exploitation at the edge, structuring knowledge for discovery, improving analytic throughput, aiding ISR functions, layered analysis and interpretation, effects prediction for decision support and cross domain access for effective ISR.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Data Shaping for Exploitation	0.000	0.000	2.470	
When tracing the information processing chain from the sensor inputs to the user/analysts, the automated techniques that are known and can be applied become fewer and less mature. The simple information process chain goes from (1) data tagging to (2) pre-processing to (3) multi-source common data representation to (4) triage/identify high priority data subsets for analysis and action. Candidate research topics to be explored include pattern analysis, data classification for importance and prioritization, criticality assessment, change detection, uncertainty management and reduction, high level structures, data search and retrieval, feature extraction, automatic translation, and automated or assisted pattern recognition. Program Outputs and Efficiencies – (U) Increased awareness of the underlying assumptions and error propagation for sensor information processing pipelines. Streamline sensor data to user timelines.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602663D8Z Joint Data Management Research	**PROJECT NUMBER** P266

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: (U) Initiate applied research in candidate areas. Evaluate potential candidates for transition into experimentation and demonstration.				
Data Discovery for Exploitation In order to better to discover and exploit the growing amount of sensor data, the following areas of research are considered: Object recognition in scenes and streams, discovery and exploitation at the edge, structuring knowledge for discovery, improving analytic throughput, aiding ISR functions, layered analysis and interpretation, effects prediction for decision support and cross domain access for effective ISR. Program Outputs and Efficiencies – (U) Determine areas where activity modeling and advanced sensor cueing will accelerate user awareness of the information available. *FY 2010 Plans:* (U) Initiate applied research in candidate areas. Evaluate potential candidates for transition into experimentation and demonstration.	0.000	0.000	2.470	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not Applicable

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602670D8Z Human, Social and Culture BehaviourModeling (HSCB)Applied Research

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	6.074	7.643	9.446						Continuing	Continuing
P270: Human, Social and Culture BehaviourModeling (HSCB)Applied Research	6.074	7.643	9.446						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) This program is focused on developing an applied science base and general-use, cross-domain capabilities/tools to support the HSCB applications domains of operational, planning, analysis, training and operations experimentation (wargamming). The work will focus on computational/analytical anthropological data collection, theory development, and application methodologies and tools. It will create software tools to allow decision makers (Intelligence analysts, operations analysts, operations planners, wargamers) to have available forecasting tools for socio-cultural (human terrain) responses at the strategic, operational and tactical levels. It will provide data infrastructure/frameworks that will facilitate subsequent model development and validation, human behavior based theory for DoD-relevant models; visualization infrastructures to rapidly assess the human terrain at strategic to tactical levels; and, situation-relevant education and training tools for disparate user communities.

Database Infrastructure/Framework will facilitate subsequent model development and validation.

Human behavior based theory, for DoD relevant Models, from created software that will allow decision makers to have available forecasting tools for socio-cultural (human terrain) responses at the strategic, tactical and operational levels.

Visualization Infrastructure designed to rapidly assess the human terrain at strategic levels, and development and mature situation relevant education and training tools for disparate user communities.

Situation-relevant education and training tools will focus on computational/analytical anthropological data collection, theory development, and application methodologies and tools.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	6.246	7.685	9.609	
Current BES/President's Budget	6.074	7.643	9.446	
Total Adjustments	-0.172	-0.042	-0.163	
Congressional Program Reductions				
Congressional Rescissions		-0.042		
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.158			
Undistributed reductions	-0.014			
Other			-0.163	

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P270: Human, Social and Culture BehaviourModeling (HSCB)Applied Research	6.074	7.643	9.446						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) This program is focused on developing an applied science base and general-use, cross-domain capabilities/tools to support the HSCB applications domains of operational, planning, analysis, training and operations experimentation (wargamming). The work will focus on computational/analytical anthropological data collection, theory development, and application methodologies and tools. It will create software tools to allow decision makers (Intelligence analysts, operations analysts, operations planners, wargamers) to have available forecasting tools for socio-cultural (human terrain) responses at the strategic, operational and tactical levels. It will provide data infrastructure/frameworks that will facilitate subsequent model development and validation, human behavior based theory for DoD-relevant models; visualization infrastructures to rapidly assess the human terrain at strategic to tactical levels; and, situation-relevant education and training tools for disparate user communities.

Database Infrastructure/Framework will facilitate subsequent model development and validation.

Human behavior based theory, for DoD relevant Models, from created software that will allow decision makers to have available forecasting tools for socio-cultural (human terrain) responses at the strategic, tactical and operational levels.

Visualization Infrastructure designed to rapidly assess the human terrain at strategic levels, and development and mature situation relevant education and training tools for disparate user communities.

Situation-relevant education and training tools will focus on computational/analytical anthropological data collection, theory development, and application methodologies and tools.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Data Infrastructure/Framework	1.328	2.000	2.964	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Generation of functional architectures for managing and disseminating socio-cultural data, information and analysis products vertically and horizontally within DoD. Strategies to collect cultural and societal information in denied or difficult to penetrate areas. Development of hand-held/portable tools to collect cultural and societal information. *FY 2008 Accomplishments:* Developed methods and tools to allow remote and “boots on the ground” collection of pedigreed social and cultural information relating to a population (local, regional, global), including the print, voice, and video media, social networks, and cultural, religious and tribal alliances. The work focused on areas of operation in USCENTCOM, USPACOM, and USEUCOM. The work is identifying methods to collect relevant socio-cultural data for Phase 0 and Phase 4 operations. Accomplishments: • Initiated framework to implement end to end collection, normalization, modeling, and analysis infrastructures and frameworks for HSCB modeling in partnership with MAP-HT JCTD. • Initiated the integration of COMPOEX modeling framework to support hybrid model use. *FY 2009 Plans:* Develop technologies capable of collecting, storing, and normalizing data and establishing semantic translation for mapping relevant data to common schema. This will provide DoD with the capability to broadly disseminate socio-cultural data across operational levels (Strategic to Tactical) and between user communities (Intelligence, Influence Operations, Planners). *FY 2010 Plans:* Develop technologies capable of extracting relevant data into databases for further modeling to support denied, restricted, or unavailable area ethnographies. Develop technologies capable of leveraging extracted data (e.g. from surveys), and processing and validating it. Develop technologies in which data can be ascribed a measure of veracity and with evidentiary value such that with the data is broadly useful as it perpetuates throughout the system. Examine the use of general use meta data technologies for multi purpose/multi modal applications.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Human behavior based theory for DoD Models	3.500	2.958	3.952	

Validation techniques across the spectrum of applications (Intelligence, Influence Operations, Planning) applied to quantitative models of social-cultural factors in coalition warfare, as well as those social cultural factors of military significance for emerging conflicts. A human behavior modeling framework that is independent of specific sociocultural values, attitudes and beliefs.

FY 2008 Accomplishments:
Created and validated, human terrain forecasting models that enable examination of second, third, and higher order effects of kinetic and non-kinetic actions within a theater in support of current operations. The work provided an initial DoD capability to model intended or unintended Political, Military, Economic, Societal, Infrastructure and Information (PMESII) effects of military actions.

Accomplishments:
• Initiated efforts to develop the cultural basis of models and simulation environments.
• Completed workshops that collected and assimilated industry, academia, and military inputs associated with HSCB cultural understanding and technologies.
• Completed workshop on strategic communication to understand the social and technical issues associated with audience analysis, message dissemination and other topics.
• Completed field assessments of a “measuring progress in conflict environments” application.

FY 2009 Plans:
Most models and forecasting tools are built upon experiences in a single region, a single coalition force, etc. and are not generalizable to other regions. The work will develop more generalizable models and tools that can be /reused for other regions of interest, allowing DoD to give more consideration to human, social and cultural factors in early (Phase 0) planning

FY 2010 Plans:
Focus on the application of hybrid modeling environments where hybrid means using a combination of the major modeling modalities (systems dynamics, game theoretic and agent). Develop the theory to support hybrid, generizable models across the spectrum from tactical to operational to strategic.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602670D8Z Human, Social and Culture BehaviourModeling (HSCB)Applied Research	**PROJECT NUMBER** P270

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Research the effectiveness of generizable models at the tactical, operational and strategic levels and determine the data fidelity requirements for each level of modeling.				
Situationally-relevant education and training tools	0.446	1.335	1.048	
Prototypes capable of using flexible underlying cultural models for training at the operational/tactical level. Training prototypes will be focused on relevant operational scenarios (e.g., negotiation with Middle-Eastern civilian and military forces).				
FY 2008 Accomplishments: Current methods and procedures for integrating cultural information into military operations do not satisfy the requirements for ongoing operations and are not flexible enough to rapidly deliver Just In Time training for complex new regions of interest, and relatively new mission areas (e.g. transition and reconstruction). The work provides supporting technologies to speed the development of socio-cultural understanding and the skills needed by individuals, small units, and coalitions in current and future military operations.				
Accomplishments: • Initiated analysis of cultural models that would support analysis and training tools.				
FY 2009 Plans: Tactical to strategic level kinetic and non-kinetic actions can have a large impact on green force behaviors and beliefs. The work will develop technologies, models, and skills to increase operational effectiveness through the rapid integration of socio-cultural factors into social influence tactics and information operations in current military conflicts. The goal is to accelerate the development of nontraditional, field capable technologies that enable the training/mission rehearsal of non-technical, adaptive skills related to cultural understanding, interpersonal communication, and teamwork.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602670D8Z Human, Social and Culture BehaviourModeling (HSCB)Applied Research	**PROJECT NUMBER** P270

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Operational and Strategic level non-kinetic actions can be a large force multiplier. The work will develop technologies, models, and skills to focus on the insertion of technologies to support COCOM and operational level training for planners who will need to integrate socio-cultural factors into operational planning (allowing for the planning, software execution, and rehearsal of certain non-kinetic operations).				
Visualization Infrastructure	0.800	1.350	1.482	
Common categorization of meta-information (i.e., the data source and pedigree, what types of uncertainty are associated with it, how old is the data, etc.) in existing visualization tools/decision aiding systems. Methods for visually and digitally depicting the incomplete, subjective, volatile, and/or imprecise nature of cultural information to support manual and automated analysis.				
FY 2008 Accomplishments: Developed data tagging schemes that support network enabled, collaborative geospatial visualization displays. Within DoD there are multiple sources and venues for the creation and distribution of information and data on human, social and cultural behavior (HSCB). To reuse and represent this data across systems/applications required the development of new meta-data standards that support visualization/mapping. Investigated the optimal common meta-data standards for the HSCB area.				
Accomplishments: • Initiated the development and demonstration of prototype geospatial/socio-cultural collection, modeling and visualization infrastructure utilizing the research framework of the MAP-HT JCTD.				
FY 2009 Plans: Development of visualization methods for displaying uncertainty in common geospatial tools currently used by DoD. The dynamic complexity of human behavior, beliefs and cultures means that there will always be some level of uncertainty to forecasting and mapping the human terrain. It is vital to accurately represent this degree of uncertainty in geospatial toolsets, decision aids, etc. The work will develop generalizable methods/tools for displaying this uncertainty.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602670D8Z Human, Social and Culture BehaviourModeling (HSCB)Applied Research	**PROJECT NUMBER** P270

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Development of visualization infrastructure that display hybrid data sources such as geospatial layers, person and group relationships, and related socio-cultural data in ways that are easy for the user to assimilate and that address how evidence is created using provided data and how uncertainty propagates throughout the system.				

C. Other Program Funding Summary ($ in Millions)

	FY 2008	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**Cost To Complete**	**Total Cost**
PE 0603670D8Z BA 3 /HSCB Advanced Development	2.960	9.330	11.631						Continuing	Continuing
PE 0604670D8Z BA 4 / HSCB Research and Engineering	0.989	5.958	7.096						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	3.941	9.915	23.538						Continuing	Continuing
P002: Insensitive Munitions Advanced Technology	3.941	9.915	20.428						Continuing	Continuing
P301: Enabling Fuze Advanced Technology	0.000	0.000	3.110						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 Program Managers as they develop their specific weapon programs. The program invests in and demonstrates technologies from a Joint Service perspective, thus insuring the development of technology with the broadest applicability while avoiding duplication of efforts.

This effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions (IM) requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoDI 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 Program Executive Office (PEO) IM Strategic Plans. In this way, promising formulations, ingredients, case technologies, liners and coatings can be integrated into a munition configuration and its ability to improve the IM response can be validated. Mature IM technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating their spin-off into other non-compliant munitions within their portfolios.

This 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, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority capabilities and technology needs identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service 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 a munition configuration and its ability to address required capability needs can be validated. Mature fuze technology can be transitioned, thereby decreasing program costs and schedule risk and facilitating their spin-off into other munitions within their portfolios.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology

Under the Joint IM Technology Program (JIMTP), investments are focused on specific munition areas that have been identified by the Science and Technology community and validated by the technology needs identified in the IM Strategic Plans submitted by the PEOs. These five munitions areas are: 1) high performance rocket propulsion, 2) minimum smoke rocket propulsion, 3) large caliber gun propulsion, 4) anti-armor warheads, and 5) blast and fragmentation warheads.

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 will be validated by the Program Executive Officers (PEOs) and the Heads of the Service S&T communities. These four capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects Weapon Fuzing, 3) High Reliability Fuzing, 4) and Enabling Fuze Technologies and Common Architecture.

Munition Area Technology Groups (MATGs) and Fuze Area Technology Groups (FATGs) have been established for each munitions and capability area and are tasked with 1) coordinating, establishing, and maintaining five-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 IM Strategic Plans / Fuze Technology Development Plan, and 4) interfacing with other MATGs / FATGs and IM / fuze science and technology projects as appropriate. The JIMTP and JFTP will utilize a Technical Advisory Committee (TAC) (consisting of senior DoD and DOE laboratory representatives and senior Munitions PEO representatives) to provide program oversight, policy, direction and priorities during its annual meeting.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	3.966	15.970	20.802	
Current BES/President's Budget	3.941	9.915	23.538	
Total Adjustments	-0.025	-6.055	2.736	
Congressional Program Reductions		-6.000		
Congressional Rescissions		-0.055		
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.017			
Undistributed Reduction	-0.008		-0.104	
Additional Project added to this PE			3.150	
Other			-0.310	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology					**PROJECT NUMBER** P002	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P002: Insensitive Munitions Advanced Technology	3.941	9.915	20.428						Continuing	Continuing

A. Mission Description and Budget Item Justification

This RDT&E effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions (IM) requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoDI 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 Program Executive Officer (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.

Under the Joint Insensitive Munitions Program (JIMTP), investments are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups (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 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 Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Insensitive Munitions Advanced Technology Development	3.941	9.915	20.428	
This RDT&E effort will demonstrate enabling technologies needed to develop weapons in compliance with Insensitive Munitions (IM) requirements established in United States Code, Title 10, Chapter 141, Section 2389 and DoDI 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 Program Executive Officer (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.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology	**PROJECT NUMBER** P002

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Under the Joint Insensitive Munitions Program (JIMTP), investments are focused on five Munition Areas: High Performance Rocket Propulsion, Minimum Signature Rocket Propulsion, Blast and Fragmentation Warheads, Anti-Armor Warheads, and Large Caliber Gun Propulsion. Munition Area Technology Groups (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 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. *FY 2008 Accomplishments:* (Rocket Motors) Composite case demonstration designs and case tooling fabrication 50% complete. (Anti-armor Warheads) Initial vented liner designs completed and hardware loaded for testing. (General Purpose Bombs) Mitigation of Sympathetic Reaction in General Purpose Bombs - Successfully established processing properties for two new explosive formulations and scaled-up both to the gallon level. (Artillery) Six 544-kg batches of IMX-101 were produced in manufacturing environment at BAE Holston for reliability and safety evaluation. Replacement explosive shown to be more favorable for gun launch safety. *FY 2009 Plans:* (Rocket Motors) Fabricate and perform initial structural and baseline IM tests on demonstration rocket motors for minimum signature and high-performance rocket applications. Scale-up high-performance composite propellant, for Tomahawk class motors, to 50 gallon batch for producibility. Demonstrate high-performance composite propellant IM response and ballistic performance in sub-scale analogue motors. (Anti-Armor Warheads) Complete proof-of principal IM testing for liner venting of anti-armor warhead. Demonstrate that liner venting does not adversely impact warhead performance. Demonstrate fragment impact mitigation technology on candidate warhead. (Artillery/Mortars) Complete IM and performance demonstration and transition TNT replacement explosive for artillery applications. (GP Bombs) Conduct full-scale 500-lb size environmental testing on the reactive liner concept. Down-select explosive formulation and conduct sub-scale IM demonstrations showing reactive liner benefit for preventing sympathetic detonation. (Air-to-Air Warheads) Demonstrate novel warhead concept to reduce response level to impact by fragments.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology	**PROJECT NUMBER** P002

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: (Rocket Motors) Venting technology demonstrations in minimum signature and high-performance 5-10-inch class motors. Scale up high-performance composite propellant to 150-gal batch. Demonstrate IM improvement and ballistic performance from high-performance propellant in 20-inch analog and 70-lb motors respectively. Complete venting design and begin IM demonstration for small-diameter high-quantity minimum signature rocket motors. (Anti-Armor Warheads) Demonstrate IM and no degradation in performance with a liner venting and fragment impact mitigation sleeve technology on anti-armor missile warhead. (Artillery/Mortars) Complete IM and performance demonstration and transition Comp-B replacement explosive for mortars and light-weight artillery (GP Bombs) Complete full-scale IM and performance demonstration of reactive liner in full-scale 500-lb bomb. Begin demonstration of new initiation system for very insensitive main charge explosive fills.				

C. Other Program Funding Summary ($ in Millions)

	FY 2008	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**Cost To Complete**	**Total Cost**
PE 0602000D8Z P000 BA 2 /Joint Munitions Technology	12.152	15.171	15.112						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology					**PROJECT NUMBER** P301	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P301: Enabling Fuze Advanced Technology	0.000	0.000	3.110						Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new project under Joint Munitions.

This RDT&E 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, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority capabilities and technology needs identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service S&T communities. Mature demonstrated fuze technology can 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 Program Executive Officers (PEOs) and Heads of the Service S&T communities. These four capability areas are: 1) Hard Target Survivable Fuzing, 2) Tailorable Effects Weapon Fuzing, 3) High Reliability Fuzing, 4) and Enabling Fuze Technologies and Common Architecture.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Enabling Fuze Advanced Technology	0.000	0.000	3.110	
This RDT&E 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, the Secretary of Defense Memorandum, DoD Policy on Cluster Munitions and Unintended Harm to Civilians, and shortfalls in current weapon systems. This effort will take promising technologies demonstrated at the laboratory scale and transition them into demonstration programs utilizing generic hardware based on priority capabilities and technology needs identified and validated by the Program Executive Officers (PEOs) and the Heads of the Service S&T communities. Mature demonstrated fuze technology can be transitioned, thereby decreasing their program costs and schedule risk and facilitating spin-offs to other munitions within their portfolios.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603000D8Z Joint Munitions Advanced Technology	**PROJECT NUMBER** P301

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: (Hard Target Fuzing) Demonstrate Hardened Miniature Fuze System in high-speed sled tests and demonstate in legacy high reliability penetrator. (Tailorable Effects Fuze) Generate selectable yield warhead multi-point initiation architecture and control concepts including: a) architectures utilizing lower energy detonators/initiators and b) non-conventional multi-point initiation architectures such as energetic multi-points. (High Reliability) Develop concepts for high reliability fuze architecture for cluster munitions fuzing. Identify specific technologies that would provide a significant increase in the overall fuze reliability. (Enabling Technologies) Conduct assessment of common fuze architecture technologies: safety components, modular electronics, sensors, interfaces, and packaging.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603121D8Z SO/LIC Advanced Development

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	37.169	33.447	43.808						Continuing	Continuing
206: Explosive Ordnance Disposal/Low-Intensity Conflict	7.070	7.360	7.287						Continuing	Continuing
207: Special Reconnaisance Capabilities	24.693	20.854	19.916						Continuing	Continuing
208: Information Dissemination Concepts	3.364	3.107	3.077						Continuing	Continuing
209: Irregular Warfare Support (IWS)	2.042	2.126	13.528						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 &IC).

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 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 Global War on Terrorism (GWOT), 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.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603121D8Z SO/LIC Advanced Development

P209, Irregular Warfare Support (IWS). The IWS Program develops cross-domain blended capabilities necessary to enable sustained, counterterrorism operations. This program leverages ongoing research efforts of US Special Operations Command (USSOCOM), the military departments, Defense agencies, and other federal agencies to analyze, modify, design, prototype and demonstrate enduring technical and operational capabilities. Projects support efforts to: conduct counter organization warfare, develop counter motivation capabilities, coordinate infrastructure and sanctuary denial options, and provide counter enterprise and counter financing capability to the warfighter. The Program blends several disciplines including surveillance, operations, policy, information, training, and technology.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	32.669	32.832	32.172	
Current BES/President's Budget	37.169	33.447	43.808	
Total Adjustments	4.500	0.615	11.636	
Congressional Program Reductions	-0.254			
Congressional Rescissions		-0.185		
Total Congressional Increases	7.400	0.800		
Total Reprogrammings	-2.109			
SBIR/STTR Transfer	-0.457			
Program Budget Review (PBR) 09 adjustment for Irregular Warfare Support Program			12.000	
Program Budget Review (PBR) 09 adjustments			0.213	
Undistributed Reduction	-0.080			
Efficiency Reduction			-0.577	

Change Summary Explanation

Reprogrammings:

1. Reprogramming to PE 0603122D8Z (SOLIC Advance Development) reflects internal realignment of funds to meet SOLIC priorities -- (0.309)
2. Reprogramming to Army for Aerial Canopy Sensor Delivery System (ACSDS) -- (1.000)
3. Reprogramming to SOCOM (MFP11) for Extended Lifetime Radioisotope Batteries -- (0.800)

Programming Adjustment:

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603121D8Z SO/LIC Advanced Development

Provides funding to develop new unique, critical tactical and operational capabilities to provide an advantage in defeating terrorist networks as part of the Irregular Warfare Support Program (+12M FY10-15)

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603121D8Z SO/LIC Advanced Development					**PROJECT NUMBER** 206	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
206: Explosive Ordnance Disposal/Low-Intensity Conflict	7.070	7.360	7.287						Continuing	Continuing

A. Mission Description and Budget Item Justification

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 &IC).

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Ordnance Disposal/Low-Intensity Conflict (EOD/LIC)	7.070	7.360	7.287	

FY 2008 Accomplishments:

Improved portable unmanned aerial vehicle for EOD and combat missions. Evaluated sensors to detect threats through foliage and other obscurants. Evaluated a bladderless lift balloon to lift ordnance off the sea floor. Developed tools and technologies to enhance performance of robotic platforms in EOD and SOF missions. Improved unmanned surface vessels for reconnaissance of waterways and littoral regions. Evaluated an ordnance penalty simulator for objective performance evaluation of personnel undergoing EOD training at the Naval Explosive Ordnance Disposal School.

FY 2009 Plans:

Test and evaluate unmanned aerial vehicle with improved sensors for IED detection. Integrate sensors to detect threats through foliage and other obscurants onto Special Operations Forces (SOF) riverine crafts. Modify and deliver a user-friendly bladderless lift balloon for SOF and EOD underwater missions. Develop a wireless, non-radio frequency technology for command and control of small robotic platforms for SOF use. Evaluate performance of unmanned surface vehicles to perform reconnaissance of waterways and littoral regions for SOF. Develop tools to enhance arm dexterity and reconnaissance capability of robotic platforms for Unconventional Warfare missions. Investigate potential for development of a tankless cutting torch for SOF use.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603121D8Z SO/LIC Advanced Development	**PROJECT NUMBER** 206

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Transition unmanned aerial vehicle with improved sensors for IED detection. Evaluate integrated sensors for detection of threats through foliage and other obscurants for use to SOF riverine watercraft. Transition to program of record or commercialize a user-friendly bladderless lift balloon for Special Operations and EOD underwater missions. Evaluate a wireless, non-radio frequency technology for command and control of robotic platforms for SOF use. Evaluate tools to enhance arm dexterity and reconnaissance capability of robotic platforms for Unconventional Warfare missions. Develop SOF dynamic entry tools and procedures for robotic platforms. Design and develop a tankless cutting torch for SOF use. Investigate haptic feedback technologies for control of robotic arms, grippers, and end effectors. Investigate advanced access and disablement technologies for defeat of improvised explosive and CBRN devices.7287				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

SO/LIC Advanced Development - PE 0603121D8Z; Explosive Ordnance Disposal & Low-Intensity Conflict/P206; Special Reconnaissance Capabilities/P207; Information Dissemination Concepts/P208; Irregular Warfare Support/P209

Long Term Strategies: Obtain adequate funding to support critical shortfalls; prioritize proposals that are deemed acceptable and allocate funding accordingly; and establish outreach to leverage institutional knowledge and expertise.

Performance Indicator and Rating:

FY 2009 Target:
70% of currently funded research projects are completed on time and within budget
5% increase in the number of projects transitioning to operational use

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Transition scheduled projects to user communities

FY 2010 Target:
70% of currently funded research projects are completed on time and within budget
5% increase in the number of projects transitioning to operational use

Basis of FY 2008 to Date Performance Rating:
Currently, the number of funded research projects is on track to be completed per the target.

Verification: The SO/LIC &IC Advanced Development Program projects each track the status of their efforts. Reviews are conducted to assess project status. Oversight of the entire effort is undertaken by ASD SO/LIC &IC.

Validation: Completed research products increase the capabilities of the DoD to effectively detect, deter and defend against terrorist attacks; defeat improvised explosive devices and unexploded ordinance; enable sustained information operations in denied areas; and contribute to resolution of hostile, unconventional conflicts.

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
207: Special Reconnaisance Capabilities	24.693	20.854	19.916						Continuing	Continuing

A. Mission Description and Budget Item Justification

The SRC program primary goal is to seek out and identify technical tools for the collection of actionable data which will assist DoD in its execution of the Global War on Terrorism (GWOT). To accomplish this task, 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 within USSOCOM and throughout the DoD. The program evaluates new and existing technical surveillance technologies into a reference data base.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
SPECIAL RECONNAISANCE CAPABILITIES	24.693	20.854	19.916	

FY 2008 Accomplishments:

The SRC Program continued to conduct end-to-end testing and demonstrations of a wide variety of small, power efficient beacon and sensor technologies to satisfy urgent Global War on Terrorism (GWOT) requirements. The program conducted training for unattended ground sensors for maritime and ground persistence surveillance. These capabilities and equipment were inserted into operator training exercises to vet tactics, techniques and procedures for employment. The program office identified, evaluated, and directed enhancements to existing tagging, tracking, and locating (TTL) equipment in support of other government agencies to meet emerging requirements. In addition, the office provided enhancements, fielding and conducted operational assessment of an airborne interrogator-transponder prototype system. Delivered several prototypes of a sensor-less visible camera system and began integrating night capabilities. Continued to improve data infiltration and exfiltration capabilities through the integration of advanced technology and new communications links. Continued to improve special reconnaissance (SR) optic capabilities through the integration of advanced optic technology and processing. Improved SR power capabilities through the integration of advanced power technologies and device redesign. Explored and exploited remote control capabilities by reducing form factors, improving

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
power management, and integrating air droppable and maritime capabilities. Performed field evaluations of selected SR technologies and documented results in the on-line SRC knowledgebase. Supported cooperative projects and evaluated technology maturity for new capabilities with the DoD and Other Government Agencies (OGA) that accelerate the transition of advanced SR and TTL technology to the operational community. *FY 2009 Plans:* Insert operationally capable prototypes into operator training exercises to vet technologies and develop new tactics, techniques and procedures for employment. Continue with ongoing efforts to: provide technology support to the Global War on Terrorism (GWOT) to include technology training and variants of tagging, tracking and locating (TTL) and unattended ground sensor prototypes for persistence surveillance; engage the research and development community for technical solutions and candidate technologies to improve DoD special reconnaissance (SR) operational capabilities; evaluate and operationalize sensor and TTL capabilities through insertion of mini and micro maturing technologies; research, evaluate, and integrate enhanced tagging and sensing capabilities to extend mission life and standoff emplacement; integrate extended life mission sensors, micro optics, fingerprinting, emerging precise location technologies, and improved netted SR data infiltration and exfiltration capabilities; research, evaluate, and integrate emerging netted sensor technologies into remote capabilities; perform field evaluations of selected SR technologies and document results in on-line SRC knowledgebase; and support cooperative projects with the DoD and OGA Intelligence Agencies to accelerate the transition of advanced R&S technology to the operational community. *FY 2010 Plans:* Continue to identify, evaluate, and refine promising Reconnaissance and Surveillance (R&S)-related advanced technologies and capabilities for further development, demonstration, and integration. Candidate high payoff technology areas that will be researched, identified, and matured include: improved micro-optics, encrypted wireless technology, advanced day/night sensors, enhanced high speed data fusion, incorporation of nano/pico technologies miniaturization, and the research and evaluation of enhanced TTL sub-systems.				

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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
208: Information Dissemination Concepts	3.364	3.107	3.077						Continuing	Continuing

A. Mission Description and Budget Item Justification

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.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
INFORMATION DISSEMINATION CONCEPTS	3.364	3.107	3.077	
FY 2008 Accomplishments: Continued transitioning Multi-Media Alert Processing System (MAPS) to Services. Supported counter-terrorism and combating terrorism operations by improving upon existing tools and expanding technologies to enhance monitoring and translation capabilities across the full spectrum of communication media. Developed new projects to address technology shortfalls in building partnership capacity for distribution of themes and messages favorable to Coalition operations. USSOCOM's PSYOP Global Reach (PGR) Advanced Concept Technology Demonstration (ACTD): Continued development of advanced broadcast/rebroadcast payloads designed for Predator/Extended Range Multi Purpose (ERMP) type UAS platforms. Continued POPAS development and incremental fielding and transition software/ hardware. Conducted MUAs and EUEs of scatterable media and the POPAS. Space and Naval Warfare Systems Center (SPAWAR), in FOUO text, continued development effort to track messages globally. Initiated transition to combatant commander (COCOM) and Services. Initiated transition cognitive decision making to COCOMs. Continued effort to develop stand-off technology for message delivery. Addressed limitations of deployment con-ops. Developed tool to deliver the message. Also, investigated potential for messages to be intentionally redirected by adversary. Continued effort to use commercial low power electronics for message reception. Began size reduction effort.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: USPACOM's Mulitmedia Alert Processing System (PACOM MAPS): Implement prototypes into operational environments to vet technologies and develop tactics, techniques, and workflow for actionable intelligence and sentiment analysis, based on real-time media information. Initiate projects through interagency collaboration efforts addressing technology shortfalls in media monitoring Provide technology to support the Global War on Terrorism and develop tools and techniques that assist in the analysis and planning phase of Information Operations (IO). Investigate mechanisms, sources, platforms, and payloads to provide IO operators with multiple means of being alerted with critical information that affect the delivery of messages to a targeted audience. Initiate new languages that are in various forms of media that support understanding of foreign communications. Enhance the development, demonstration, and performance evaluations of approaches that filter data from local sources and noisy environments. Enable COCOM users with advanced cultural and language skills based on current and relevant media information. Develop capabilities for timely monitoring and control delivery of messages by adversaries. Perform field evaluations of selected technologies. Support interagency projects to accelerate the transition of advanced foreign language technology to the operational community. *FY 2010 Plans:* USPACOM's Mulitmedia Alert Processing System (PACOM MAPS): Coordinate additional foreign language collection tools deriving from various sources. Provide new filters for operators to quickly triage large volumes of data from different sources of media. Enhance language learning tools' capabilities for sustaining proficiency and for responding to operator mission needs. Improve the ability to search and manage information. Increase cultural and situational awareness and responsiveness using automated language tools. Conduct further field evaluations of selected technologies. Accelerate the transition of advanced foreign language technology to the operational community.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

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E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
209: Irregular Warfare Support (IWS)	2.042	2.126	13.528						Continuing	Continuing

A. Mission Description and Budget Item Justification

The IWS Program develops cross-domain blended capabilities necessary to enable sustained, counterterrorism operations. This program leverages ongoing research efforts of US Special Operations Command (USSOCOM), the military departments, Defense agencies, and other federal agencies to analyze, modify, design, prototype and demonstrate enduring technical and operational capabilities. Projects support efforts to: conduct counter organization warfare, develop counter motivation capabilities, coordinate infrastructure and sanctuary denial options, and provide counter enterprise and counter financing capability to the warfighter. The Program blends several disciplines including surveillance, operations, policy, information, training and technology.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
IRREGULAR WARFARE SUPPORT (IWS)	2.042	2.126	13.528	
FY 2008 Accomplishments: Commenced research and analysis of the USG strategic communication (SC) enterprise to include various interagency communities encompassing public affairs, public diplomacy, information operations, and psychological operations. Trained SC users on principles and requirements of television warfare. Kicked off new research efforts aimed at analyzing online jihadi branding phenomena and self-organizing systems. Conducted exploitation and analysis of captured documents from Iranian Revolutionary Guard Corps (IRGC) with an eye towards understanding IRGC doctrine, strategic objectives, tactical employment, and ideology. Leveraged interagency and law enforcement experimental relationships to conduct executive session between several major city police chiefs and DOD leaders to explore requirements for future interagency CT and law enforcement collaboration.				
FY 2009 Plans: Research and develop capabilities that support the Department of Defense and Interagency Irregular Warfare mission in accordance with the Irregular Warfare Joint Operating Concept, DODD 3000.05, and NSPD-44. This will include further experimentation on novel capability designs; assessment of effectiveness; solutions for systems integration, new operational analysis, and development of pilot				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Irregular Warfare (IW) training and education programs across the Interagency; enhanced counter-human network operations, and novel information age operational concepts. *FY 2010 Plans:* Research and develop capabilities that support the Department of Defense and Interagency Irregular Warfare mission in accordance with the Irregular Warfare Joint Operating Concept, DODD 3000.05 and NSPD-44. This will include further operational analysis of completed FY09 plans; assessment of effectiveness; solutions for systems integration, new operational analysis, and capability design for pilot Irregular Warfare (IW) training and education programs across the Interagency; enhanced counter-human network operations, and novel information age operational concepts.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	110.534	123.012	81.868						Continuing	Continuing
P484: Combating Terrorism Technology Support (CTTS)	110.534	123.012	81.868						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Combating Terrorism Technology Support (CTTS) program develops and delivers capabilities that address needs and requirements with direct operational application in the national effort to combat terrorism. Projects are distributed among 10 mission categories: Blast Effects and Mitigation; Chemical, Biological, Radiological, and Nuclear Countermeasures; Explosives Detection; Improvised Device Defeat; Investigative Support and Forensics; Physical Security; Surveillance, Collection, and Operations Support; Tactical Operations Support; Training Technology Development; and VIP Protection. This program is a diverse, advanced technology development effort that demonstrates the utility or cost reduction potential 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.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	76.276	79.970	82.402	
Current BES/President's Budget	110.534	123.012	81.868	
Total Adjustments	34.258	43.042	-0.534	
Congressional Program Reductions				
Congressional Rescissions	-1.028	-0.678		
Total Congressional Increases	42.380	43.720		
Total Reprogrammings	-4.191			
SBIR/STTR Transfer	-2.668			
Undistributed reduction	-0.235			
Program Budget Review (PBR) 09 adjustments			-0.534	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: P484, **Biometric Terrorist Watch-List Database Management Development**		1.600
Project: P484, **Covert Sensing and Tagging System (CSTS)**		1.200

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Congressional Increase Details ($ in Millions)	**FY 2008**	**FY 2009**
Project: P484, **Combating Terrorism Technology Support Office STAR-TEC Partnership Program**		2.400
Project: P484, **Improved LAS Glass-Ceramic Laminated Armored Window Systems**		1.600
Project: P484, **EDIT Technology for Counter-Tunnel Operations and Cache Detection**		0.800
Project: P484, **Facial Recognition Technology Initiative**		2.000
Project: P484, **Facility Security Using Tactical Surveys**		3.000
Project: P484, **Low-Cost Stabilized Turret**		1.600
Project: P484, **Machine Augmented Composite Armor**		0.800
Project: P484, **Military/Law Enforcement Counterterrorism Test Bed**		2.400
Project: P484, **Port and Hull Security 3D, Real Time Sonar System - Echoscope**		1.600
Project: P484, **Roll-On, Roll-Off Reconnaissance, Surveillance, and Special Mission Palletized System**		4.000
Project: P484, **Tactical Biometrics Operating and Surveillance System (TBOSS)**		1.600
Project: P484, **Ultra Portable Unmanned Surveillance Helicopter**		1.000
Project: P484, **Validation of an Enhanced Urban Air Blast Tool**		2.400
Project: P484, **SOF Unattended Sensor Network (Note: only for SBIR SOCOM 03-004)**		1.280
Project: P484, **Radio Inter-Operability system (RIOS)**		0.800
Project: P484, **BOPPER (Bioterrorism Operation Policy for Public Emergency Response)**		1.200
Project: P484, **Ex-RAD Radiation Protection Program** Congressional Add in incorrect line of accounting ~ will be reprogrammed Feb 2009 to OASD(HA)/TMA less FFRDC and Econ Ass deductions.		5.000
Project: P484, **Full Scale Impact and Blast Loading Laboratory Testing Program**		1.600
Project: P484, **Remote Sensor Network Services Platform**		2.000
Project: P484, **Robotic Mobility Platform System**		1.200
Project: P484, **Unmanned Aerial Vehicle Avionics Upgrade (UAVAU)**		1.200

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Congressional Increase Details ($ in Millions)	**FY 2008**	**FY 2009**
Project: P484, **Document and Media Search Discovery**		1.440

Change Summary Explanation

Reprogrammings:

1. Reprogramming to SOCOM - Comprehensive Martitime Domain Awareness (Congressional Add) -- (4.500)
2. Reprogramming from PE0603121D8Z - Adjustment reflecting internal realignment of funds to meet SO/LIC priorties -- 0.309

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P484: Combating Terrorism Technology Support (CTTS)	110.534	123.012	81.868						Continuing	Continuing

Note

President Obama's PB10 reduced this PE by ($1,079).

A. Mission Description and Budget Item Justification

The Combating Terrorism Technology Support (CTTS) program develops and delivers capabilities that address needs and requirements with direct operational application in the national effort to combat terrorism. Projects are distributed among 10mission categories: Blast Effects and Mitigation; Chemical, Biological, Radiological, and Nuclear Countermeasures; Explosives Detection; Improvised Device Defeat; Investigative Support and Forensics; Physical Security; Surveillance, Collection, and Operations Support; Tactical Operations Support; Training Technology Development; and VIP Protection. This program is a diverse, advanced technology development effort that demonstrates the utility or cost reduction potential 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.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
BLAST EFFECTS AND MITIGATION	6.833	5.291	5.488	
FY 2008 Accomplishments: Demonstrated state-of-the-art entry control point (ECP) technology in the Central Command Area of Responsibility (CENTCOM AOR). Upgraded the Warfighter Battle Damage Assessment program by displaying on digital bodies of different genders and morphological types, performance of "what if" analysis for increased body armor weight vs. increased protection, and integrating existing epidemiological data collection software. Determined that breacher injuries may incur during standard training practices. Result of the study are currently being used to direct future research into protective gear for breachers and improvement of existing blast standoff distances. Developed a covert, lightweight, & easily transportable high strength polymer applicator for the purpose of blast mitigation to structures and related collateral damage.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Develop entry control point design software to adapt to the current threat. Refine and provide critical blast information to military, industrial, and civil engineers by performing experiments in a configurable urban city test facility. Test and evaluate a lightweight polymer application apparatus that uses existing polymer materials for blast mitigation. Characterize and blast test homemade terrorist explosive mixtures. Develop commercial off-the-shelf (COTS) technologies for blast mitigation. Examine blast mitigation strategies to protect critical U.S. infrastructure to include electrical power sub-stations, dams, and maritime facilities. Demonstrate integrated systems to protect facilities from vehicle borne improvised explosive devices, suicide bombers on foot, and standoff weapons. Develop an advanced head form for measurements involving the effects of blast injury and head trauma. Convert the enhanced blast effects database into a web-based application. *FY 2010 Plans:* Research new concepts in blast mitigation for expeditionary use to meet requirements for rugged, long lasting, and transportable entry control points and other security facilities. Promulgate standards for blast testing and simulation for both suicide bomber vests and vehicle bombs to support testing of commercial off the shelf products. Conduct Phase 2 development of the urban environment blast testing to better understand impact on facades, street furniture, tunnels, and infrastructure. Characterize and blast test homemade explosive mixes. Conduct Phase 2 assessments of the engineering aspects on human injury prediction and mitigation, with an emphasis on blast effects in an urban environment, and the effects of repeated blast exposure. Deploy a web-based blast effects database.				
CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR COUNTERMEASURES *FY 2008 Accomplishments:* Completed lab testing and initiated user field evaluation of color-based sensor array for chemical agent detection. Conducted design testing of self-contained escape respirator in preparation for National Institute for Occupational Safety and Health (NIOSH) certification. Conducted performance testing to finalize design for a pocket-size, low-profile escape respirator capable of meeting NIOSH standards. Initiated testing for risk-based permeation criteria for Toxic Industrial Chemicals (TICs). Designed vehicle retrofit kit for emergency mass evacuation. Built a prototype total organic carbon detector for water. Built	9.719	6.704	6.954	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and evaluated collection system for alpha and beta radiation detection in water. Populated database for chemical instrumental libraries for detection of threat agents. Developed a draft guide to assist explosive ordnance disposal and bomb squad personnel in recognizing radiological dispersion devices. Field tested a transportable gasifier unit for destruction of contaminated biomass. Finalized prototype for a portable test kit for collective protection filters. Conducted a personal protective equipment conference to determine needs of the emergency response and military communities. Evaluated additional potential food borne threats. Conducted operational field test of the personal hydration system water filter kit. Developed and tested optical fiber chemical indicators for two additional classes of chemicals with independent laboratory confirmation of performance. Conducted second subject matter expert workshop on environmental sampling. Initiated testing on bio-terrorism operations and related public health preparedness.				
FY 2009 Plans: Evaluate performance of a pathogen- and puncture-resistant glove for military and law enforcement tactical operations. Design a tactical response boot with integrated chemical protection. Develop an air supply pass-through kit for Level A chemical protective ensembles. Design and test a pocket-size, low-profile escape respirator to meet National Institute of Occupational Safety and Health standards. Develop a test protocol to evaluate escape hoods for special-needs populations. Transition to end-users a chemical instrumental library database for detection and identification of chemical threat agents. Initiate development of a standoff chemical detection system. Develop a mass decontamination corridor water heating system. Design an advanced small-room chemical and biological filtration system. Design and develop an integrated carbon fiber and High-Efficiency Particulate Air (HEPA) filtration system. Develop an advanced adsorbent material to capture gaseous chemical threat agents. Develop a software decision support tool for determination of chemical agent filter life. Perform operational testing and evaluation of mass casualty evacuation bus retrofit kit.				
FY 2010 Plans: Operationally test a tactical response boot with integrated chemical protection. Test and evaluate an air supply pass through kit for Level A chemical protective ensembles. Test and evaluate test protocol for special-needs populations escape hoods. Conduct operational testing of a standoff chemical detection				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
system. Test and evaluate a mass decontamination corridor water heating system. Test and evaluate an advanced small-room chemical and biological filtration system. Test and evaluate a prototype integrated carbon fiber HEPA filtration system. Test and evaluate an advanced adsorbent material to capture gaseous chemical threat agents. Test and evaluate a software decision support tool for determination of chemical agent filter life.				
CONCEPT DEVELOPMENT *FY 2009 Plans:* Moved to VIP	0.000	0.000	0.000	
EXPLOSIVES DETECTION *FY 2008 Accomplishments:* Assessed the feasibility of an X-ray system for real time imaging of vehicles for vehicle-borne improvised explosive device detection. Evaluated prototype systems for standoff detection of explosives worn on the body. *FY 2009 Plans:* Evaluate prototype X-ray system for real time imaging of vehicles for vehicle-borne improvised explosive device detection. Develop active illumination upgrade to imaging and anomaly detection systems for personnel screening. Develop a prototype system for standoff detection of suicide bombers, which combines ultrasound and lasers. Develop a database of chemical and physical signatures of improvised explosive devices to enhance standoff explosives detection capabilities. Conduct test and evaluation of current hardened handheld explosive detection prototypes. *FY 2010 Plans:* Incorporate fusion and detection algorithms, synchronize electronics, and demonstrate feasibility of an active illumination upgrade to imaging and anomaly detection system. Conduct a side-by-side evaluation of sensors for suicide bomber detection. Investigate spectra of chemical compounds related to the presence of explosives or physical signatures of components for database. .Modify size and weight of	8.313	7.164	7.431	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
the hardened handheld explosive detection systems. Prototype the ruggedized vehicle X-ray system for field operations.				
IMPROVISED DEVICE DEFEAT	6.551	6.174	6.404	
FY 2008 Accomplishments: Manufactured the final prototypes and conducted bench test of the Multiple IED Disruption System. Built an initial prototype of the Single Sided Imaging System. Designed and fabricated a utility cart with custom interface for the Single Sided Imaging System. Characterized additional sets of general disruption tools designed for use against VBIEDs. Populated the electronic tool characterization decision-making database and guide with characterization data. Developed new tools and end effectors for integration with current EOD robotic platforms. Developed a low cost user-friendly robotics package that allows integration with currently available all-terrain vehicles. Tested, evaluate, and commercialize the EOD Tool Cart. Demonstrated, tested, and evaluated new classes of affordable mid-sized, two and four wheeled unmanned ground vehicles for military and homeland security applications. Demonstrated a plug-and-play capability for the integration of a JAUS compliant X-ray targeting system and components with a Joint Architecture for Unmanned Systems (JAUS) compliant robotic platform.				
FY 2009 Plans: Evaluate and transition new tools and end effectors for integration with EOD robotic platforms. Conduct final modifications to, and operational evaluation of the Multiple IED Disruption System. Design and begin development on a WMD response-capable bomb suit with integrated ballistic, overpressure, and CBRN protection. Integrate a utility-cart-carried Single Sided X-ray Imaging System with a fielded robotics platform. Conduct explosive tool characterization and testing of select IED/VBIED disruption charges and populate the Tool Characterization Guide. Integrate Joint Architecture for Unmanned Systems compliant Multiple IED Disruption Systems with a fielded robotics platform, and conduct field demonstrations. Design and develop nonexplosive IED defeat tools for VBIED operations. Integrate and test a fielded robotic system with a JAUS compliant interface for visual and X-ray targeting. Develop a ruggedized field-portable, digital X-ray imaging system for military and homeland security applications. Evaluate emerging RCIED threats to aid in the development, design, and testing of ECM-related bomb disposal tools and equipment.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603122D8Z Combating Terrorism Technology Support	**PROJECT NUMBER** P484

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2010 Plans: Incorporate a Self Contained Breathing Apparatus (SCBA) with the WMD response-capable bomb suit and integrate technician/command post communication capability. Conduct explosive tool characterization of select IED/VBIED disruption charges for population of the Tool Characterization Guide. Develop non-dynamic access and disruption tools for remote-manual and robotic operations. Enhance, test, and evaluate state of the art electronic countermeasure systems for IED neutralization and disruption. Integrate nonexplosive IED defeat tools for VBIED operations with a robotic platform. Ruggedize, test, and perform user-defined modifications to the robotically employed Single-Sided X-ray Imaging System. Develop advance power solutions for conducting sustained robotics operations and employment of EOD-peculiar equipment. Design and develop ECM tools and equipment to counter emerging Radio Control Improvised Explosive Device) RCIED threats.				
INFRASTRUCTURE PROTECTION *FY 2009 Plans:* Moved to Physical Security.	0.000	0.000	0.000	
INVESTIGATIVE SUPPORT AND FORENSICS *FY 2008 Accomplishments:* Fielded a 3-D Ear ID system that identifies persons in videos from their ear pattern. Fielded a two-way multifunctional encrypted radio that provides law enforcement with the capability to monitor and record a body wire channel while simultaneously providing a command channel. Distributed a system for the automatic analysis of text for author attribution. Fielded 10 heated and cooled canine kennels that protect and extend the effective operational period of dogs in harsh environments by keeping them at their ideal temperatures. Improved the performance and scientific defensibility of dog teams by improving the absorption materials used for collecting human scent. Fielded Sensitive Site Exploitation kits that provided combatants greater ability to collect and analyze forensic type evidence and information in hazardous combat areas. Distributed a forensic audio spectral analysis tool allowing forensic examiners and aircraft investigators the capability to analyze noise signals to determine information about crashes	3.526	4.178	4.334	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
and other transportation incidents. Deployed three master trainers to Special Operations Forces in order to retain and augment the current canine and handler abilities in theater. *FY 2009 Plans:* Produce a canine human scent identification working protocol. Improve the protocols for remote biometric assessment. Improve forensic capabilities for retrieving data from electronic equipment. Distribute new protocols for fingerprint recovery from improvised explosive devices. Improve the performance and scientific defensibility of dog teams by improving the absorption materials used for collecting human scent and enhance operational canine technology. Distribute an upgraded system for identification of automobiles. Evaluate interview and elicitation methods and techniques in field settings. Field multilingual site exploitation training. *FY 2010 Plans:* Field improved questioned document analysis techniques for analyzing disguised handwriting. Field advance interview techniques based on cognitive load principles. Field automated credibility assessment procedures. Deliver a remote viewer for evidence manipulation and comparison for use between theater and U.S.-based labs. Expand human scent collection from forensic evidence research. Develop tools for the extraction of digital evidence from commonly used electronic equipment. Identify shortcomings within deployment, training, and training aids for military working dogs.				
PHYSICAL SECURITY *FY 2008 Accomplishments:* Conducted crash tests of domestic and international, nonstandard installation techniques of vehicle security barriers and updated existing vehicle barrier guide. Conducted an international conference on Maritime Security Technologies. Completed an in-flight test of a secure means of data communications between military/commercial aircrafts and ground stations. Fielded a prototype early warning system for critical drinking water infrastructure. Developed an integrated cyber and physical assessment tool. Deployed and evaluated the performance of the evacuation simulation-planning tool. Tested and fielded remotely operated underwater screening to detect anomalies on submerged facilities and ship hulls.	13.146	11.050	11.460	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Tested and fielded ruggedized, high payoff commercial systems to enhance protection for coalition forces. *FY 2009 Plans:* Develop an integrated personnel-screening system with remote capability to detect metallic, nonmetallic, and improvised explosive devices. Assess and demonstrate entry point screening and force protection technology. Construct facility to test and compare deployable and tactical prescreening and surveillance equipment that is usable by security forces in high threat urban entry control point operations. Integrate novel sensors to extend perimeter/border capabilities to increase situational awareness and provide earlier warning of potential adversary attack. Develop critical infrastructure dependency modeling standards and tools. Investigate capabilities to detect, locate, surveil, and disrupt subterranean operations in semi-permissive and non-permissive environments, allowing tactical forces to conduct operations. *FY 2010 Plans:* Develop deployable, tactical electronic security system concepts to fuse data to support security forces in urban combat environments. Test and compare deployable and tactical prescreening and surveillance equipment that is usable by security forces in high threat urban entry control point operations. Test vehicle barriers and blast walls against complex attacks. Explore enhanced video assessment and tracking techniques. Identify research and development projects that satisfy interagency and international requirements to address the adaptive threat associated with homemade explosives. Develop a compact system to enhance Maritime Situational Awareness (MSA) for small to medium sized vessels. Develop capabilities to detect, locate, surveil, and disrupt subterranean operations in semi-permissive and non-permissive environments, allowing tactical forces to conduct operations.				
PROGRAM MANAGEMENT *FY 2008 Accomplishments:* Provided program management oversight and technical support for CTTS R&D projects. Augmented the CTTS program office with contract, financial, and security management personnel. Managed an additional $101 million in funds from other agencies. Managed international cooperative R&D	11.869	7.197	7.465	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
programs including the United Kingdom, Canada, Israel, Australia, and Singapore. Established goals, objectives, and plans to reinforce interagency participation for the identification and prioritization of CTTS mission area requirements. Solicited proposals via BAA for new projects and tasks based on prioritized requirements. Directed the program, planning, and execution of projects and associated contracts, including the daily management and reporting for more than 500 separate contracts and tasks. Developed and implemented improvements for the BAA Information Delivery System (BIDS) solicitation process including enhanced outreach via training to potential submitters on BIDS use. Developed and implemented process improvement initiatives for the Business Information System processes. *FY 2009 Plans:* Provide program management and technical support for CTTS R&D projects including funds from other agencies and management of international cooperative R&D programs. Establish goals, objectives, and immediate revisions to plans that will reinforce interagency participation for the identification and prioritization of CTTS mission area requirements. Direct the program, planning, and execution for projects and associated contracts using direct and indirect budget allocations. Review and revise existing process and execution plans for CTTS mission area management and reporting responsibilities. *FY 2010 Plans:* Provide program management and technical support for CTTS R&D projects including funds from other agencies and management of international cooperative R&D programs. Establish goals, objectives, and immediate revisions to plans that will reinforce interagency participation for the identification and prioritization of CTTS mission area requirements. Direct the program, planning, and execution for projects and associated contracts using direct and indirect budget allocations. Review and revise existing process and execution plans for CTTS mission area management and reporting responsibilities.				
SURVEILLANCE, COLLECTION AND OPERATIONS SUPPORT *FY 2008 Accomplishments:* Improved access to open source media through new language processing technologies for multimedia information from degraded input sources. Continued to develop biometric and novel technology areas to improve tagging, tracking, and locating. Applied the gains in facial recognition technology to long-	27.369	10.707	11.105	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
range video surveillance. Continued to investigate and improve biometric fusion techniques. Investigate methods and concepts for increasing the effectiveness of human identification at a distance when a person is aided by automated facial recognition algorithms. Continued to develop automated tools and techniques to aid deployed forces in foreign language and cultural awareness skills. Developed simulation tools for deployable units operational efforts. Continued to improve technology for airborne threat detection. Investigated and improved tunnel detection technology. Field-tested of hand-emplaced and Unmanned Aerial Vehicle (UAV) delivered sensor systems configured for aero-bodies in jungle environment. Continued to develop ISR package in roll-on/roll-off platform. Established prototype ISR testbed for sensor development and evaluation. Improved surveillance of borders in high risk through remote sensors. *FY 2009 Plans:* Enhance open source media through new language processing technologies for degraded input sources. Improve biometric and novel technology areas for tagging, tracking, and locating. Increase performance of facial recognition technology for long-range video surveillance and human identification at a distance. Transition language processing techniques including increasing support for additional languages and domains to deployable systems for use. Enhance geolocation and targeting capabilities. Develop simulation tools for deployable units and operational efforts. Improve biometric handheld devices to enroll, identify, and verify persons of interest during operational efforts. Research and develop various methods and tools that enhance biometric collection, verification, and identification processes and technologies. *FY 2010 Plans:* Continue to enhance various technologies for precise geolocation of targets of interest. Improve tagging, tracking and locating infrastructure including development of smart tags that can alert preset conditions. Develop tools to assist in the tactical triage of collected Cellular exploitation micro-electronic device exploitation (CELEX/MEDEX), especially in languages of particular interest. Develop exfil capabilities for real-time audio and video surveillance.				
TACTICAL OPERATIONS SUPPORT	11.238	9.338	9.686	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Delivered integrated level IIIA Ballistic Helmets for operational test and evaluation. Delivered a portable countermeasure for remote controlled garage doors and conducted test and evaluation. Finalized the design for an improved small laser target designator prototype. Delivered a portable, high bandwidth universal communications converter for testing and evaluation. Delivered a prototype reusable non-pyrotechnic diversion device and conducted operational test and evaluation. Delivered a small tactical cutting torch for operational test and evaluation. Developed a next generation enhanced tactical rope-ascending device. Finalized the design for a compact amplifier and low-profile antenna to support use of the Multiband Inter/Intra Team Radio (MBITR) in military and civilian vehicles. Completed a large-scale interagency assessment of a compact wireless 360 degree mobile display system. Developed and delivered tactical surveys for select high risk facilities that will enable first responders to react to a crisis with enhanced safety, speed and effectiveness. Improved the system parameters of a two-dimensional and three-dimensional through-wall imaging system to support tactical user requirements. *FY 2009 Plans:* Deliver a next generation, high-performance tactical rope-ascending device for operational test and evaluation. Conduct operational testing of a weapon scope capable of switching between near and far sighting. Deliver a prototype small laser target designator for operational test and evaluation. Conduct operational testing of a tactical helmet with integrated face shield, improved ballistic, and blast protection. Conduct operational testing of a listening device that is capable of launching from a standard 40mm weapon. Deliver and test a compact amplifier and low-profile antenna to support use of the Multiband Inter/Intra Team Radio (MBITR) in military and civilian vehicles. Test a remote physiological monitoring system for soldiers in high-exertion combat operations. Conduct target characterization and initial development of a directed energy standoff vehicle stopper system. Develop a detection system that will alert soldiers of optics devices viewing them. Develop appliqués that enable current optical devices to receive & transmit point-to-point 'free-space' IR communication. Develop a tactical rifle-aiming device that includes point laser and flood IR/white light with a common control pad. Develop a vertical-rectification system for soldier-viewed imagery. Deliver an intrinsically safe distraction device for use by assault teams during shipboard operations. Develop a high intensity tactical infrared light for military vehicles. Deliver next generation front line viewing units for operational test and assessment in their				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
mobile command centers. Develop a portable system of wireless infrared illuminators with motion sensors to enhance site security for tactical forces. *FY 2010 Plans:* Confirm final design and deliver a production ready dual-purpose weapon scope. Deliver a production ready fully integrated ballistic helmet. Deliver a production ready launched listening device. Deliver a production ready compact amplifier and low-profile antenna to support use of the MBITR in military and civilian vehicles. Deliver a physiological monitoring system that can remotely monitor the status of soldiers deployed worldwide. Test a directed energy vehicle stopper system mounted on a helicopter. Deliver a rugged optical device detection system and develop an enhanced variant with target discrimination and identification capabilities. Deliver a toolkit with multiple rugged optical communications appliqués and develop a vehicle mounted variant for mobile ground operations. Deliver a tactical rifle-aiming device that integrates point laser and flood IR/white light with a common control pad. Deliver a pole-camera system with embedded vertical rectification and test a weapon-mounted variant. Develop a portable system of wireless infrared illuminators with motion sensors to enhance site security for tactical forces. Finalize the design, and deliver high intensity tactical infrared light for military vehicles for operational test and evaluation.				
TRAINING TECHNOLOGY DEVELOPMENT *FY 2008 Accomplishments:* Developed and integrated a fully automated adaptive and adversarial behavior model with a commercial game engine in order to reduce the time and resources needed to design and execute a simulation training event. Developed the capability to create 3D equipment simulations for web and CD-based training for any piece of equipment to provide students with training prior to receiving the actual piece of equipment. Converted portions of the level one WMD-Response Element Advanced Laboratory Integrated Training and Indoctrination (WMD-REALITI) program to a web-based course. Completed a portable, non-toxic simulant training kit for decontamination exercises that mimics the relative vapor pressure and solubility characteristics of G, H, and V agents. Deployed an evidence collection training package for joint-services that includes instructor-led training, supporting publications, and evidence collection kits. Transitioned a guidebook that allows on-scene personnel to rapidly assess a situation	3.800	4.811	4.990	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
that may involve the presence of homemade explosives to alert military EOD team or state or local bomb squad personnel. *FY 2009 Plans:* Conduct an analysis of Irregular Warfare operations and activities within the educational domain in order to support an increased interagency and international capability. Develop adaptive, artificial intelligent crowd models to train warfighters in handling crowd-related scenarios (e.g., riot control, disaster management, emergency evacuation, rescue operations, urbanized conflicts, etc.), formulate strategies, answer "what-if" scenarios, and evaluate contingency plans. Deliver a program of instruction for next generation canine capability. Design and develop an instructor-led and supplemental computer-based training program for improving military law enforcement activities in current operations. Design and develop a simulator for the MK44 / M134 Minigun weapon system that accurately mimics the form and functionality of the actual weapon system, and integrate the simulator into a simulated training environment with realistic scenarios. *FY 2010 Plans:* Develop a virtual-live fire simulation housed in a container that can duplicate the conditions of a long, known distance range complex and an urban environment. Design and develop a computer-based training program for increasing post-blast investigation capabilities of military explosive ordnance disposal personnel. Design and develop a computer-based training program for increasing improvised explosive device awareness for military and civilian law enforcement personnel.				
VIP PROTECTION *FY 2008 Accomplishments:* Deployed the projectile database with ballistic and physical data for additional ammunition evaluated against standard armor materials. Integrated a blast/fragmentation test protocol into armored passenger vehicle standards and guidelines. Designed and developed an improved concealable body armor prototype for the protective services community. Deployed field-installable inconspicuous vehicle armor kits for operational evaluation. Packaged and released a database of state-of-the-art vehicle and body armor technologies currently available to the Government. Designed a mobile video processing system	8.170	7.356	7.630	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
that integrates with various camera systems to enhance situational awareness and incident response capabilities. Detailed requirements and concept of operations for a portable prelaunch Man-Portable Air Defense System (MANPADS) threat detection capability. *FY 2009 Plans:* Develop a ruggedized version of the VIP security kit for indoor/outdoor surveillance and intrusion detection. Miniaturize a mobile video processing system that integrates with multiple camera systems for enhanced situational awareness and incident response capabilities. Develop a tracking and locating device for high risk personnel that uses available cellular and satellite networks for global coverage. Develop and test a protective services portal system for standardized operations planning and enhanced interoperability between agencies. Research and develop advanced methodologies and automated analytical tools to improve entity and relationship resolution, identify dynamic changes to organizational structures, and recognize terrorist activity and plans. Develop a post-event analysis tool to identify and correlate weapons used in gunfire incidents. Develop a portable MANPADS pre-launch detection system to enable early warning to aircraft. Enhance and integrate a networked vehicle monitoring system with an existing facility security system to alert tactical response teams to motor pool sabotage attempts. Develop a tinting system that instantaneously darkens or lightens armored passenger vehicle windows to enhance information security and hinder focused VIP attacks. *FY 2010 Plans:* Test and deploy the ruggedized VIP security kit for indoor/outdoor surveillance and intrusion detection. Evaluate domestic and overseas performance of the high-risk personnel tracking and locating device. Develop a protective services portal training system for incorporation into an existing law enforcement training course. Demonstrate performance of the advanced methodologies and automated analytical tools on counterintelligence data sets. Test the post-event gunfire analysis tool against audio files of known weapon firings. Deploy the portable MANPADS pre-launch detection for operational evaluation. Install the networked vehicle anti-tamper system on a variety of tactical response vehicles and evaluate monitoring and alerting capabilities. Install the window tinting system in an armored passenger vehicle and assess improvements in information security and reduction in focused attack accuracy.				

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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

Long Term Strategies: Obtain adequate funding to support critical shortfalls; prioritize proposals that are deemed acceptable and allocate funding accordingly; establish outreach programs with the interagency to leverage institutional knowledge and expertise; utilize cooperative research and development (R&D) agreements with the United Kingdom, Canada, Israel, Singapore, and Australia to leverage technology investments.

Performance Indicator and Rating:

FY 2009 Target:
70% of currently funded research projects are completed on time
5% increase in the number of projects transitioning to operational use
Continue full R&D programs with existing and new foreign partners

Verification: The CTTS Program utilizes a database to track the status of the projects. Quarterly program reviews are conducted to assess project status. In addition, an annual report is produced that assesses the status of current projects and the ability to accept new projects.

Validation: Completed research products increase the capabilities of the DoD to effectively detect, deter, and defend against terrorist attacks; thus the Departments personnel and interests at home and abroad are safer from terrorism.

FY 2010 Target:
70% of currently funded research projects are completed on time
5% increase in the number of projects transitioning to operational use
Continue full R&D programs with five existing foreign partners

Verification: The CTTS Program utilizes a database to track the status of the projects. Quarterly program reviews are conducted to assess project status. In addition, an annual report is produced that assesses the status of current projects and the ability to accept new projects.

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Validation: Completed research products increase the capabilities of the DoD to effectively detect, deter, and defend against terrorist attacks; thus the Departments personnel and interests at home and abroad are safer from terrorism.

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603200D8Z Joint Advanced Concepts

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	7.817						Continuing	Continuing
P202: Joint Advanced Concepts	0.000	0.000	5.873						Continuing	Continuing
P203: Joint Electronic Warfare	0.000	0.000	1.944						Continuing	Continuing

A. Mission Description and Budget Item Justification

Acquisition reform initiatives call for top down, national security strategy-driven capabilities-based planning. The Joint Advanced Concepts (JAC) program supports acquisition reform initiatives and early capabilities based strategic investment decisions that ensure joint, integrated, interoperable, system-of-system combat capability to the warfighter. Provides early shaping of acquisition programs, to include Special Access Programs, from a capabilities portfolio management perspective to deliver improved capabilities to the joint warfighter. This shaping is supported through capability-based assessments, requirements analysis, joint capability area assessments, integrated roadmap development, and the development/integration of risk-based collaborative tools to conduct capability-based assessments. These efforts were previously funded under PE0604875D8Z, Joint Systems Architecture Development.

Provides funding for Joint Electronic Warfare (EW) initiatives. The EW Joint Analysis Team (established in November 2007) fills a void identified by the Combatant Commanders for a group to coordinate the disparate EW activities across the Department. Provides funding to the EW JAT for establishing the Joint Electronic Warfare Center (JEWC) as the executive agent for coordination between Combatant Commanders, Services, Office of Secretary of Defense, Joint Staff, Weapon Schools, Technology Centers, Academia and DT&E organizations. Provides for EW exploitation analysis of the inter-relational effects of combined-systems evaluations in mission area needs in such domains as Integrated Air and Missile Defense, Blue Force Identification, Netted-sensors and Command and Control.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	0.000	0.000	0.000	
Current BES/President's Budget			7.817	
Total Adjustments			7.817	
Congressional Program Reductions				
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer				
Program Budget Review Adjustments			7.817	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603200D8Z Joint Advanced Concepts					**PROJECT NUMBER** P202	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P202: Joint Advanced Concepts	0.000	0.000	5.873						Continuing	Continuing

A. Mission Description and Budget Item Justification

Acquisition reform initiatives call for top down, national security strategy-driven capabilities-based planning. The Joint Advanced Concepts (JAC) program supports acquisition reform initiatives and early capabilities based strategic investment decisions that ensure joint, integrated, interoperable, system-of-system combat capability to the warfighter. Provides early shaping of acquisition programs, to include Special Access Programs, from a capabilities portfolio management perspective to deliver improved capabilities to the joint warfighter. This shaping is supported through capability-based assessments, requirements analysis, joint capability area assessments, integrated roadmap development, and the development/integration of risk-based collaborative tools to conduct capability-based assessments. These efforts were previously funded under PE0604875D8Z, Joint Systems Architecture Development.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Joint Advanced Concepts	0.000	0.000	5.873	
FY 2010 Plans: This project supports focus areas in portfolio management and activities associated with our program evaluation responsibilities providing for early shaping of Pre-Milestone A programs. Provide early shaping of Department-wide portfolio based investment decisions, development, coordination and institutionalization of enterprise wide Business Rules and procedures for investment strategies and resource balancing, integration of the requirements process with the acquisition process to bridge our military and civilian areas of responsibility with all COCOMS, Services and Agencies. Provides DEPSECDEF & DoD Components advice on how to maximize capability investment to meet warfighter needs. Leads the development of integrated capability roadmaps, and supports acquisition program reviews and Guidance for Development of the Force. Represents A&T interests in requirements for future acquisition systems. Develops and updates capability roadmaps to inform decision makers for portfolio investment decisions, DoD Requirements and POM decisions. This program will fund analysis in several portfolio areas such as Electronic Warfare, Single Integrated Air Picture (SIAP), Joint Integrated Air and Missile Defense (JIAMD), Combat Identification (CID), Blue Force Tracking (BFT).				

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603200D8Z Joint Advanced Concepts	**PROJECT NUMBER** P202

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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APPROPRIATION/BUDGET ACTIVITY	**R-1 ITEM NOMENCLATURE**	**PROJECT NUMBER**
0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	PE 0603200D8Z Joint Advanced Concepts	P203

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P203: Joint Electronic Warfare	0.000	0.000	1.944						Continuing	Continuing

A. Mission Description and Budget Item Justification

Provides funding for Joint Electronic Warfare (EW) initiatives. The EW Joint Analysis Team (established in November 2007) fills a void identified by the Combatant Commanders for a group to coordinate the disparate EW activities across the Department. Provides funding to the EW JAT for establishing the Joint Electronic Warfare Center (JEWC) as the executive agent for coordination between Combatant Commanders, Services, Office of Secretary of Defense, Joint Staff, Weapon Schools, Technology Centers, Academia and DT&E organizations. Provides for EW exploitation analysis of the inter-relational effects of combined-systems evaluations in mission area needs in such domains as Integrated Air and Missile Defense, Blue Force Idenitfication, Netted-sensors and Command and Control.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Joint Electronic Warfare	0.000	0.000	1.944	
FY 2010 Plans: This project supports Joint Electronic Warfare Center Support to the Electronic Warfare Joint Analysis Team as the conduit between Combatant Commanders, who determine EW Requirements, and the EW JATs analytical team. Perform analysis to determine blue force operations within the Electro-Magnetic Spectrum, determine adversary technology trends, provide modeling, analysis, and simulation expertise for concept testing and validation, and provide objective oversight of field testing to ensure real world dynamics are considered. This analysis will assess how EW interacts with other warfighting areas. It will draw upon combined-systems evaluation events geared to mission area needs in such domains as Integrated Air and Missile Defense, Blue Force Identification, Netted-sensors and Command and Control.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603200D8Z Joint Advanced Concepts	**PROJECT NUMBER** P203

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	22.392	23.598	23.276						Continuing	Continuing
P225: Joint DOD/DOE Munitions	22.392	23.598	23.276						Continuing	Continuing

A. Mission Description and Budget Item Justification

The mission of the Joint Department of Defense (DoD)/Department of Energy (DOE) Munitions Technology Development Program (JMP) is to develop advanced technologies needed to meet warfighting needs and bring about major improvements in non-nuclear munitions. A Memorandum of Understanding (MOU) between DoD and DOE provides the basis for the long-term commitment to this effort. Under the auspices of the JMP, the fusion of DOE technologies with Joint Services needs has provided major advances in warfighting capabilities for many years and continues to play a crucial role in the exploration, development, and transition of new technologies needed by the Services. The JMP is aligned with Department strategic plans such as the key capability gaps and CoCom (needs consistent with the Research and Engineering (R&E) Metrics for Force Development and is developing needed munitions capabilities and modeling tools for urban combat and counter-terrorism efforts. The JMP provides a proven and successful mechanism for the collaboration of DoD and DOE scientists and engineers so they can develop technologies of interest to both Departments, within a structured framework of technical reviews and scheduled milestones. The JMP has strong support from the Services through the leadership by DoD lab managers and technical experts of JMP technical activities and in collaborations on the transition of new capabilities to industry. This interdepartmental cooperation makes use of the substantial historic investment in scientific resources by the DOE, and the budgeted JMP funds represented in this justification are supplemented by matching DOE funds.

A summary of recent JMP accomplishments and transitions is provided below; detailed technical plans, reports, and presentations are also available. Endorsements from DoD labs indicate a strong history of JMP accomplishments and significant Return on Investment (ROI). The Army's Picatinny Arsenal has stated that modeling and simulation (M&S) tools developed by the JMP are now routinely used to design all new warheads, and the use of these tools has reduced the number of validation tests required for each new warhead from about 5 to 1, resulting in substantial savings. The Army's Army Research Laboratory has demonstrated unprecedented times to deploying new armor solutions to Iraq Theater of Operation (ITO) employing M&S tools developed by the JMP. Compared to recent JMP investments in these M&S tools, an ROI of about 3 can be estimated for these warheads alone, and the tools continue to be used.

Over the last several years, there has been increased emphasis on developing technologies of value to counter-terrorism efforts and Military Operations in Urban Terrain (MOUT). Initial successes have already emerged from this JMP focus, with some products already in the field. A new and rapidly emerging JMP technology which employs Multiphase Blast Explosives (MBX) will enable the use of precision lethality munitions in urban settings with minimal collateral damage. Based on modeling and technologies developed by the JMP, preliminary tests of MBX integrated in a composite case successfully demonstrated minimum collateral damage. In a related activity, the Air Force and the Navy are pursued a Joint Capability Technology Demonstration Program (JCTD) to incorporate MBX technology into the Small

Diameter Bomb (SDB) Focused Lethality Munition. Boeing delivered initial weapons for operational assessment, based on these technologies originating from the JMP in FY 2008.

Other JMP transitions include several diverse transitions of the mini Synthetic-aperture radar (SAR)/Microsystems Enabled Scalable Array SAR (MESASAR)-based technologies from defense to science. Two specific DoD transitions include a Unmanned Aerial Vehicle (UAV)-based application and a demo/study for a version of miniSAR being used as a gunship radar upgrade. Cheetah, an advanced themochemical predictive code, developed with JMP funds, reached a milestone with the recent release of version five. This code is used by over 400 DoD and DOE scientific and engineering staff to study and select energetic materials for modern munitions. Further, all new fuze designs being developed by DoD and DOE utilize technologies such as highly compact capacitors, transformers, and sensors developed by the JMP. In addition, state-of-the-art robotic and machine vision discrimination technologies are being successfully applied to munitions demilitarization programs and are being prototyped on several systems, most recently transitioned for a Cluster Bomb Unit (CBU) Download Workcell. A major update to the Constitutive Properties and Constitutive Modeling database was released across the DoD and DOE including data and model parameters for a range of classic and advanced material models for metals and metal alloys, energetic materials, and polymers. New releases of the shock physics code ALE3D and CTH-PRESTO were delivered to the DoD user base and for the Beta Tests under the DoD's High Performance Computing Modernization Office (HPCMO) Multiphase Flow, Target Response (MFT) Portfolio.

The integrated DoD and DOE efforts within the JMP are speeding the realization of new technologies through the advanced development process. The highly challenging technical objectives of the approximately 50 JMP projects require multi-year efforts, and sustained, long-term investments are necessary to achieve success. The JMP is a focal point for collaborative work by over 260 DoD and DOE scientists and engineers, and has been called a model of how the Departments should cooperate, both within their respective organizations (intradepartmental) and with each other (interdepartmental). The JMP also works aggressively, through the Defense Ordnance Technology Consortium (DOTC), to inform industry of the technologies and tools being developed so that they can be transitioned equitably and efficiently for use by our warfighters as quickly as possible.

Projects in the JMP are organized in five munitions technology focus areas. They are: Initiation, Fuzing, and Sensors; Energetic Materials; Computational Mechanics and Material Modeling; Warhead & Penetration Technology; and Munitions Lifecycle Technologies. These focus areas are described more fully in the accompanying R2a project exhibit.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	23.284	23.727	23.701	
Current BES/President's Budget	22.392	23.598	23.276	
Total Adjustments	-0.892	-0.129	-0.425	
Congressional Program Reductions				
Congressional Rescissions		-0.129		
Total Congressional Increases				
Total Reprogrammings	-0.249			
SBIR/STTR Transfer	-0.643			
Other			-0.425	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development					**PROJECT NUMBER** P225	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P225: Joint DOD/DOE Munitions	22.392	23.598	23.276						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Department of Defense (DoD)/ Department of Energy (DOE) Munitions Technology Development Program (JMP) is a collaborative, jointly-funded effort between DoD and Department of Energy (DOE), which has the mission to develop new and innovative warhead, explosive, initiation, and lifecycle technologies, as well as enabling tools, in order to bring about major improvements in non-nuclear munitions. The JMP supports the development and exploration of advanced munitions concepts and enabling technologies which precede system engineering. Through a Memorandum of Understanding (MOU) arrangement with DOE, DoD resources are evenly matched. More importantly, this relatively small DoD contribution effectively taps the annual multi-billion dollar DOE Research, Development, Test, and Evaluation (RDT&E) investments by accessing technical experts with highly specialized skills, advanced scientific equipment, unique facilities, and computational tools not available within DoD. These efforts take advantage of the extensive and highly developed technology base resident in the DOE National Laboratories relevant to achieving the JMP goals of developing capable, cost-effective, conventional munitions.

The JMP is aligned with Department strategic plans such as the key capability gaps and CoCom needs consistent with the Research and Engineering (R&E) Metrics for Force Development and is developing needed munitions capabilities and modeling tools for urban combat and counter-terrorism efforts. The JMP provides a proven and successful mechanism for the collaboration of DoD and DOE scientists and engineers so they can develop technologies of interest to both Departments, within a structured framework of technical reviews and scheduled milestones. The JMP has strong support from the Services through the leadership by DoD lab managers and technical experts of JMP technical activities and in collaborations on the transition of new capabilities to industry.

The JMP currently supports about 50 projects which can be summarized in five technical focus areas: Initiation, Fuzing, and Sensors; Energetic Materials; Computational Mechanics and Material Modeling; Warhead and Penetration Technology; and Munitions Lifecycle Technologies. The JMP is administered and monitored by the Office of the Secretary of Defense (OSD), and reviewed annually by the Technical Advisory Committee (TAC) composed of over 25 senior executives from the Army, Navy, Air Force, Special Operations Command, the Defense Threat Reduction Agency (DTRA), OSD, and DOE. Projects are organized in ten Technology Coordinating Groups (TCGs) in order to bring together the disciplines necessary to properly evaluate technical content and progress. DoD Service laboratory technical experts lead each of the Technology Coordinating Groups to ensure that the technologies under development address high priority DoD needs; they also coordinate the semi-annual technical peer-review process.

Please see the corresponding R2 exhibit for additional JMP background information and accomplishments. More details about each of the technical focus areas are described below in the Accomplishments/Planned Program sections.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development	**PROJECT NUMBER** P225

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Joint DOD/DOE Munitions / Computational Mechanics and Material Modeling	7.605	8.774	8.698	
In the area of Computational Mechanics and Material Modeling, the Joint Department of Defense (DoD)/ Department of Energy (DOE) Munitions Technology Development Program (JMP) is developing the ability to accurately predict the behavior of weapons in operating environments of extreme pressure, temperature, and velocity. This capability is essential to the development of lethal, accurate, and cost effective systems. To meet the needs of the DoD and DOE communities, there is a requirement for validated models using high-performance computing hardware and software that are capable of carrying out a broad class of continuum mechanics simulations where shock waves, nonlinear dynamics, and multi-materials gas dynamics are important. In particular, this aspect of the JMP focuses on significant improvements to material models that accurately represent the materials of interest in dynamic states coupled with numerical and algorithmic improvements to enhance our problem-solving capabilities for munitions development, advanced energetics, and target lethality predictions. Four general classes of modeling codes offer solutions to the varied requirements posed by the defense community for the shock analysis regime. Eulerian shock physics tools are effective for a large number of conventional weapons and advanced energetics-related simulations. In situations where there is significant material deformation and turbulent mixing, Eulerian formulations are the most efficient. A second class of codes addresses the large, nonlinear dynamics that can be important for weapons design and development. Such Lagrangian calculations provide design information that complements information provided by the Eulerian shock physics codes. For example, many penetration problems involve detailed structural mechanics that are not appropriate for Eulerian codes but can be addressed by Lagrangian methods. A third class of tools combines these capabilities by using Arbitrary Lagrangian-Eulerian (ALE) algorithms to solve the conservation equations appropriate for shock analysis. This class of codes performs a range of simulations such as penetration mechanics, thermal cook-off, and fragment impact, where multi-physics phenomena descriptions are required across a wide range of time scales that cannot be addressed adequately with either Eulerian or Lagrangian codes. These ALE codes and associated validated material models represent the future in modeling complex dynamics encountered in a broad spectrum of applications across the defense community. Meshless Particle Techniques such as the Dual Particle Dynamics (DPD) Code have been under development for several years. Particle codes				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603225D8Z Joint DOD/DOE Munitions Technology Development	PROJECT NUMBER P225

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
are particularly effective for problems with severe distortions, damage, and failure, phenomena that can be problematic to capture with the workhorse Lagrangian codes. The Department's utilization of these capabilities has primarily been in the Science and Technology (S&T) community. It is desirable to extend the use of modeling and simulation tools into the engineering design community, and the JMP is pursuing this objective and continues to provide and enhance these advanced modeling tools. *FY 2008 Accomplishments:* Include distribution of a major update to the Constitutive Properties and Constitutive Modeling database across the DoD and DOE. The database included nearly 4500 files of reports and material pedigree, raw test data, and model parameters for a range of classic and advanced material models for metals and metal alloys, energetic materials, and polymers relevant to the DoD and DOE. New code releases (ALE3D and CTH-PRESTO) were delivered to the DoD user base and for the Beta Tests under the DoD's High Performance Computing Modernization Office (HPCMO) Multiphase Flow, Target Response (MFT) Portfolio. The development of Eulerian, Lagrangian, ALE, and meshless codes relevant to the design and evaluation of munitions continued. CTH, a workhorse shock physics code developed by the JMP, is used everywhere from desktop PC's to massively parallel High Performance Computing (HPC) centers across the community. It is the number 1 "go-to" hydrocode for the weapons community, and has been instrumental in the development of a number of DoD weapon systems. CTH continues to be improved and made available to both Departments. Development also continued on the improvement and demonstration of ALE3D, a multi-physics code. Progress continued in the cross DOE laboratory implementation of formalisms for treating anisotropic plasticity in metal and viscous damage in energetic materials into ALE3D and CTH. The JMP also provides a conduit into the DoD for the improved materials models emerging from the DOE Advanced Simulation and Computing Program (ASC), providing high resolution, accurate predictions of materials behavior and failure relevant to the analyses of weapon systems. In 2008 modeling and simulation tools transitioned out of the JMP played important roles in a number of DoD activities related to Global War on Terrorism (GWOT) and Iraq Theater of Operation (ITO). The transition and support for these tools and models, along with user training, were provided to the DoD community.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development	**PROJECT NUMBER** P225

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Includes the continued development, extension, and application of the hydrocodes and associated materials models to warhead and explosives design and evaluation. Ongoing code and material model development will focus on greater accuracy, improved physics, extension to mixed phase flow problems, and increased scale of system level simulations. The JMP will continue to support the transition of these tools as well as the training of, and consulting for, the DoD user community. New material models will continue to be migrated into codes, including CTH and ALE3D. Efforts continue to improve the physical underpinning of material models to offer improved fidelity to temperature and strain rate dependence, capture complex load path and stress state dependence. The task for non-shock initiation of energetic materials continues to support the broader evaluation of hazards. Development continues for SIERRA, a new simulation concept for integrating individual physics codes together into a single application, promising to reduce the time needed to apply models to new physical situations. A new emphasis has been placed on improving the multi-phase flow modeling capability in CTH and ALE3D. Numerical methods, e.g. meshless methods, are being developed to overcome deficiencies in hydrocodes to maintain numerical stability and predict damage softening, localization, and failure. These numerical methods will then be incorporated into hydrocodes across DOE and DoD. There is an increased focus on the inclusion of stochastic effects, verification and validation, and quantification of errors and sensitivities of solutions.				
FY 2010 Plans: Includes the continued development, extension, and application of the hydrocodes and associated materials models to warhead and explosives design and evaluation. Ongoing code and material model development will focus on greater accuracy, improved physics, extension to mixed phase flow problems, and increased scale of system level simulations. The JMP will continue to support the transition of these tools as well as the training of, and consulting for, the DoD user community. New material models will continue to be migrated into codes, including CTH and ALE3D. Efforts continue to improve the physical underpinning of material models to offer improved fidelity to temperature and strain rate dependence, capture complex load path and stress state dependence. The task for non-shock initiation of energetic materials continues to support the broader evaluation of hazards. Development continues for SIERRA, a new simulation concept for integrating individual physics codes together into a single application,				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
promising to reduce the time needed to apply models to new physical situations. A new emphasis has been placed on improving the multi-phase flow modeling capability in CTH and ALE3D. Numerical methods, e.g. meshless methods, are being developed to overcome deficiencies in hydrocodes to maintain numerical stability and predict damage softening, localization, and failure. These numerical methods will then be incorporated into hydrocodes across DOE and DoD. There is an increased focus on the inclusion of stochastic effects, verification and validation, and quantification of errors and sensitivities of solutions.				
Joint DOD/DOE Munitions / Energetic Materials The energetic materials (EM) focus area is aimed at developing the next-generation of EMs that have increased energy density over those in the current inventory, while attempting to provide enhanced insensitivity to extreme environments. There is a need to develop EMs that, when integrated into munitions, offer advantages of enhanced lethality against a variety of targets. Lighter and/or less bulky munitions significantly reduce the logistics burden of military actions and are also highly desirable. Similarly, a decrease in hazard classification brought about by the use of insensitive energetic materials and better designs will greatly decrease transportation and storage costs. Smarter munitions, capable of selectable, differential output, are another advantage to military agility. Hence, there is also a need for advanced EMs that can be used in small-scale devices such as distributed fuzing systems. In addition, as the operational environments have become more severe, EMs must survive setback forces in guns and severe impact forces in hard-target penetration applications. For enhanced lethality effects, the energy in EMs must be released either in the detonation reaction zone, or early enough in the gas expansion process so that it couples to impulse loading or sustains high temperatures. Increased lethality of EMs and munitions while simultaneously reducing collateral damage is of critical importance. Enhanced lethality requires that the energy be released in an appropriate time domain to allow optimized coupling to the target. Material ingredients that contribute to later energy release offer no enhancement in lethality. For micro devices suitable for distributed fuzing systems, the requirement on energy release is very exacting in order to sustain reaction propagation in environments with extensive shock and heating losses. Like advanced initiation, advanced energetic materials are an enabling technology for the next generation of weapon systems that will be safer, smaller, and more lethal.	4.809	4.831	4.928	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This focus area previously developed a thermal laser ignition technique in conjunction with fast temperature diagnostics to enable hard radiation imaging by proton radiography to investigate burning and propagation of a high explosive subsequent to a thermal ignition. This was the first time to physical state and damage evolutions were directly measured during cook-off of a high explosive. Preliminary characterization has been completed in preparation for extending this work to polymer-bonded explosive (PBX) N9. A small scale detonation experiment in the form of the mini-sandwich test was developed for use with conventional high explosives. The newest version of Cheetah 5, thermochemical codes able to predict the performance of new explosives, were distributed to over 400 users and a users tutorial was given to the DoD user base. Syntheses scale up of DAAF and TAGDNAT progresses and samples of the latter were transitioned to the Navy. Samples of DNTF and LLM-172 were delivered to the Army. *FY 2009 Plans:* For EM the mini-sandwich test developed for use with conventional high explosives is being further developed for testing of insensitive high explosives. Cheetah 6 development is ongoing and will include improvements of both the equation of state (EOS) and kinetics models, done in conjunction with targeted experimental measurements. A Java Graphical interface will be developed to insure that the code continues to be user friendly. In addition to continuation of the proton radiography experiments for visualization of slow cook-off, a series of experiments are being developed to use the technique to visualize the detonation front within a detonator-booster-main charge integrated assembly. High explosive formulation efforts continue, including a spray-on formulation. Development of nanoscale, microscale, and mesoscale energetic materials with enhanced performance that are less sensitive and more cost effective enablers for defense transformation will continue. Computer codes for modeling cook-off behavior with coupled thermal/mechanical response will also be developed including numerical methodologies to deal with the flow of energetic materials within confined. A new microreactor technology will be investigated as an alternate method for synthesis of energetic compounds. The development and characterization of an LLM-105 booster composition will continue.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: For EM the mini-sandwich test developed for use with conventional high explosives is being further developed for testing of insensitive high explosives. Cheetah 6 development is ongoing and will include improvements of both the equation of state (EOS) and kinetics models, done in conjunction with targeted experimental measurements. A Java Graphical interface will be developed to insure that the code continues to be user friendly. In addition to continuation of the proton radiography experiments for visualization of slow cook-off, a series of experiments are being developed to use the technique to visualize the detonation front within a detonator-booster-main charge integrated assembly. High explosive formulation efforts continue, including a spray-on formulation. Development of nanoscale, microscale, and mesoscale energetic materials with enhanced performance that are less sensitive and more cost effective enablers for defense transformation will continue. Computer codes for modeling cook-off behavior with coupled thermal/mechanical response will also be developed including numerical methodologies to deal with the flow of energetic materials within confined. A new microreactor technology will be investigated as an alternate method for synthesis of energetic compounds. The development and characterization of an LLM-105 booster composition will continue.				
Joint DOD/DOE Munitions / Initiators, Fuzes, and Sensors Initiators, fuzes, and sensors are critical components in every munition system. These components must work together to ensure personnel safety by preventing unintended weapon detonation, allow arming of a firing mechanism, detect the target through the use of sensors, and initiate detonation when required. With the increasing need for robust, hard-target-defeat capability, advanced fuze systems must be able to survive and function in increasingly higher-velocity and higher-G penetration environments. Methods for these sub-systems to survive high-G environments include the miniaturization, integration, and/or robust packaging of conventional fuze components such as detonators, switches, transformers, capacitors, sensors, and advanced batteries. In support of this technology area, the Joint Department of Defense (DoD)/Department of Energy (DOE) Munitions Program (JMP) continues to demonstrate advances in miniaturizing high-voltage Electronic Safe and Arm Devices (ESAD), through research and development of low-energy detonator/booster combinations, and with miniature Capacitive Discharge Units (CDUs). This focus builds on recent advances in micro-detonic/energetic materials research	4.424	4.437	4.311	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
and MicroElectroMechanical Systems (MEMS) device development. Efforts in this portion of the JMP generally advance fuze technology and ultimately provide the DoD and DOE with next generation fuzing components for all weapons, particularly hard-target-defeat munitions (penetrators), and small, intelligent low-cost applications (artillery). Advanced initiation technology is an enabler for the next generation of warheads that can be aimed, are target adaptable, and extremely robust. The primary focus of sensors in this focus area relate to guidance applications for precision weapons. *FY 2008 Accomplishments:* Include several diverse transitions of the Synthetic-aperture radar (SAR)/Microsystems Enabled Scalable Array SAR (MESASAR)-based technologies from defense to science, from Antarctica with the US Coast Guard to the outer space with the National Aeronautics and Space Administration (NASA), from manned to unmanned, and from airborne to space. A first demonstration sample of a nascent spray coated thin film thermal battery was delivered. A new low-cost sprytron triggered switch was built and delivered, providing an improved reliability over current Metal Oxide Semiconductor (MOS) Controlled Thyristor (MCT) high voltage vacuum switches for advanced ESADs. A predictive tool bridging the Spice electrical code and the Kowin hydrocode has been successful completed to predict complex behavior of multipoint firing systems. A suite of new diagnostics are being developed for the study of detonator behavior, with two-dimensional (2D) High Speed Laser Schlieren Movie diagnostic and a 2D Particle Image Velocimetry (PIV) flow diagnostic in FY 2008. *FY 2009 Plans:* This focus area includes design and development of 10- and 20-W solid state power amplifiers using gallium nitride (GaN) monolithic integrated circuits in support of future mini-SAR/MESASAR developments. The Vertical Cavity Surface Emitting Lasers (VCSEL) project continues development of a robust and compact photonic proximity sensor for munitions applications, with applicability as a Height-of-Burst (HOB) sensor. The effort focuses on developing innovative technologies for advanced thermal batteries will proceed to full electrochemical cell fabrication and testing. The further exploration of the effects of firing slappers at the low inductances associated with miniature firing systems will feed into an integrated fire set demonstration. Furthering the development of new diagnostics applying state of the art technologies to improving and expanding the dimensionality, scale, scope and/or accuracy				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
of traditional diagnostics, new three-dimensional (3D) temporally resolved diagnostics will continue to be developed including Dynamic Optical Topography of Surfaces (DOTS), spatial interferometery and structured light techniques. A "hard-science" question associated with miniature munitions is the transfer of detonation from a miniature detonator into the main charge explosive. This could dramatically affect the performance of a small munition. We will continue to study microdetonics, which refers to detonation initiation, acceleration (buildup), and curvature effects in small explosive systems. We plan to conduct numerous small-scale tests to determine the performance of insensitive high explosives of interest. The other portion of the microdetonics effort is to develop the diagnostics for characterizing detonator/booster explosive behaviors and a design code that will make effective use of the microdetonics data for miniature munitions design. Over the next five years, this portion of the JMP will work toward demonstrating emerging technologies that support robust, intelligent fuzing that can survive and function in environments exceeding 30,000 G's.				
FY 2010 Plans: This focus area includes design and development of 10- and 20-W solid state power amplifiers using gallium nitride (GaN) monolithic integrated circuits in support of future mini-SAR/MESASAR developments. The Vertical Cavity Surface Emitting Lasers (VCSEL) project continues development of a robust and compact photonic proximity sensor for munitions applications, with applicability as a Height-of-Burst (HOB) sensor. The effort focuses on developing innovative technologies for advanced thermal batteries will proceed to full electrochemical cell fabrication and testing. The further exploration of the effects of firing slappers at the low inductances associated with miniature firing systems will feed into an integrated fire set demonstration. Furthering the development of new diagnostics applying state of the art technologies to improving and expanding the dimensionality, scale, scope and/or accuracy of traditional diagnostics, new three-dimensional (3D) temporally resolved diagnostics will continue to be developed including Dynamic Optical Topography of Surfaces (DOTS), spatial interferometery and structured light techniques. A "hard-science" question associated with miniature munitions is the transfer of detonation from a miniature detonator into the main charge explosive. This could dramatically affect the performance of a small munition. We will continue to study microdetonics, which refers to detonation initiation, acceleration (buildup), and curvature effects in small explosive systems. We plan to conduct numerous small-scale tests to determine the performance of insensitive high explosives of interest. The				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603225D8Z Joint DOD/DOE Munitions Technology Development	**PROJECT NUMBER** P225

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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Joint DOD/DOE Munitions / Munitions Lifecycle Technologies	1.591	1.667	1.606	
Munitions lifecycle technologies, including stockpile aging, surveillance, demilitarization, and disposal, are developed under the auspices of the Joint Department of Defense (DoD)/ Department of Energy (DOE) Munitions Technology Development Program (JMP) . The Department has a large and growing inventory of conventional munitions in its demilitarization stockpile. Currently, the stockpile includes more than 400,000 tons and is expanding by about 70,000-100,000 tons per year. As the long-term focus for demilitarization and disposal within the DoD turns from open-burn (OB) and open-detonation (OD) to resource recycle and recovery, alternative technologies are required to turn waste materials into useful products. The technologies developed in this portion of the JMP enhance DoD capabilities to field safe, cost-effective processes for disposal, resource recovery, and reutilization of munitions and munitions components. For an aged weapon stockpile that has not reached end of useful life, reliability and surety may change with time because of age-related degradation of constituent materials. Existing stockpile assessment methods typically focus on addressing materials aging and reliability problems after they occur, rather than on anticipating and avoiding future problems or failure mechanisms. The predictive materials aging and reliability portion of the JMP is focused on improving our ability to understand, measure, predict, and mitigate safety and reliability problems caused by materials aging and possible degradation in weapons systems. Together with complementary demilitarization technologies, this focus provides a base of scientific knowledge and understanding that enhances the Department's ability to efficiently support the late phases of weapon lifecycle. *FY 2008 Accomplishments:* This project Included completion of PC-based, component lifetime prediction models. They include a solder interconnect fatigue model, and a temp/humidity life prediction model (predicts Die Crack and Corrosion). These models are being run yearly with environmental data obtained from the dormant				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
storage program in the JMP. They show that, in general, parts studied are robust and are expected to last several decades. In addition, the RRAPDS (Remote Readiness Asset Prognostic/Diagnostic System) Health Monitoring Unit from Redstone Arsenal (collects and stores time-stamped sensor data including temperature, relative humidity, and drop distance) was integrated into the dormant storage program. An engineered aged structure (EAS) system, including hardware and software was also designed for implementation in future plans. The GROMIT software package was completed and an updated version of YADAS software package was released as part of a suite of methods and tools for assessing stockpile reliability based on assessing surveillance data collection activities within a cost-benefit framework. Two case-studies based on DoD systems have been completed for resource allocation. The JMP is continuing to support the transition of these tools as well as the training of, and consulting for, the DoD user community. Robotic technologies for disassembly of munitions employing machine vision improvements where developed, with a robotic demilitarization processes being transitioned for a Cluster Bomb Unit (CBU) Download Workcell.				
FY 2009 Plans: For this thrust area includes continued studies on predictive material aging of solders, including the investigation of tin wiskers, electronics corrosion, and aging of propellants and adhesives. Experimental studies on electroplated tin (Sn) coatings and physical vapor deposition (PVD) thin films are ongoing and two modeling approaches are being considered to describe/predict Sn whisker growth. Further development of the Bayesian approach to system reliability assessment will be conducted. The development of robotic disposal of munitions will continue and new automation technologies for removing and safeing sub-munitions that are automatically armed on exit from a projectile will be developed. A project to develop a solid-phase microextraction-gas chromatographic-mass spectrometric (SPME GC-MS) for monitoring and analysis of propellants is continuing. A focused effort is going into developing broader munitions lifecycle efforts in the areas of stockpile aging and surveillance to complement to strong successes in transitioning of technologies in the areas of demilitarization and disposal.				
FY 2010 Plans: For this thrust area includes continued studies on predictive material aging of solders, including the investigation of tin wiskers, electronics corrosion, and aging of propellants and adhesives. Experimental				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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Joint DOD/DOE Munitions / Warhead and Penetration Technology	3.963	3.889	3.733	
In the warhead and penetration technology thrust, a major activity continues to be design and development of technologies and warheads for hard-target-defeat. As hard-target weapons evolve, several technical issues need to be addressed, including penetrators, fuzing, and simulation tools, along with associated validation data. Hardened military facilities are being buried in layered earth and concrete, "cut and cover" constructions, tunneled into mountainsides, or mined into rock far beneath the earth's surface. Buried structures accounted for a significant number of targets attacked by our forces during the Gulf, Afghanistan, and Iraq wars, and much of our military planning is being devoted to defeating them. Thus, a major thrust of the Joint Department of Defense (DoD)/ Department of Energy (DOE) Munitions Technology Development Program (JMP) continues to be hard-target-defeat. As hard-target weapons evolve, several technical issues need to be addressed. Specifically, penetrators striking targets with obliquity or at high angles of attack experience violent dynamic responses that can cause their cases to fail or interfere with the functionality of fuzes. Similarly, oblique, low velocity target impacts can result in ricochet, undesirable shallow trajectories, or bouncing out of the target. In general, new delivery vehicles tend to be smaller and faster, requiring smaller penetrators that carry less payload, and must survive more stressing impacts. Developing improved penetrating weapons depends on a solid understanding of the physics of penetration as well as affordable materials and processes to execute new designs that require more strength and durability from the penetrator. Although we can predict penetration depth with acceptable confidence, there are some targets for which we have insufficient data and experience; consequently, predicting the path a penetrator will take and whether it will survive is much less certain.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
The JMP provides a fundamental penetration technology base that addresses many of these issues and enables our future strike weapons. Additionally, warhead concepts which greatly extend the current range of capabilities in speed and tailored target effects are being explored. With increasing emphasis and interest in defeating targets of military interest in civilian areas, and of defeating and neutralizing Weapons of Mass Destruction (WMD) facilities, the application of energy to targets must be thoroughly controlled and understood. This requirement places increased demands on warhead output and is being pursued under the JMP. *FY 2008 Accomplishments:* In FY08 this project Included the development a Micro Electro Mechanical System (MEMS) pressure sensor has shown promise to provide for the first time the interface pressure between the penetrator and the target. The first generation prototypes of the micromachined pressure sensor were designed, fabricated, and tested in the quasi-static and dynamic modes. A standard test for the fragmentation of high explosive driven metal, the Filled Hemi, was developed to allow the study of fragmentation in a simple spherically driven system. Various effects were and continue to be in the process of being parametrically probed with sufficient statistics to assess the results conclusively, as offered by the small scale test. Particular focus was given to the effect of metallurgy, composition, and heat treatment on natural fragmentation mechanisms. A fragmentation database was initiated to ensure historical data is retained and leveraged and that the considerable quantity of data generated in this prolific focus area is appropriately documented and disseminated. Through the database the JMP is serving as a focal point for fragmentation research across the DoD and DOE. The JMP is also serving as a focal point in the field to ensure investigation of common and well understood materials across numerous research efforts. *FY 2009 Plans:* In FY09 this project will include continued low collateral damage weapon verification and validation testing in comparison with current best baseline munitions. The effort involves the advancement of the science of multi-phase blast explosives (MBX) integrated with composite case penetrators to yield discriminate lethality munitions. This work will include efforts to develop and integrate technology for a new generation of precision lethality munitions based on MBX technology. The goal is to develop the technology for future munitions with two key features: increased near field lethality (at the point of				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
target engagement) and virtually zero, far field collateral damage (no fragmentation). Both of these features are critical for enabling discriminant lethality for military operations in urban terrain (MOUT) and close air support (CAS). The focus of the planned work is on understanding the science of MBX technology (material characterization, modeling and simulation, energetics, and target interaction effects). This includes the ability to model and design warheads and munitions fracture, failure, and post-fracture behavior including fragmentation. High rate continuum modeling technology will be investigated, developed, and demonstrated to provide the capability to predict and therefore control fracture and post-fracture behavior. Studies will continue toward providing a fundamental understanding of the penetration process by conducting carefully designed experiments and analyses. Linking numerous experimental research efforts in fragmentation across the DoD and DOE with well characterized pedigreed materials will support better leveraging of shared data and focus on the underlying physics of fragmentation. Well-controlled, subscale penetration and perforation experiments are planned with clearly defined experimental variables. Penetrators will be instrumented with on-board accelerometers and data recorders to acquire high quality deceleration data for penetrator response. The on-board accelerometers and data recorders are previous transitions from the JMP. Data from these experiments not only provide a crucial database on the physical phenomena of the penetration process, but also provide researchers with valuable penetration data to benchmark codes and models. *FY 2010 Plans:* In FY10 this project will include continued low collateral damage weapon verification and validation testing in comparison with current best baseline munitions. The effort involves the advancement of the science of multi-phase blast explosives (MBX) integrated with composite case penetrators to yield discriminate lethality munitions. This work will include efforts to develop and integrate technology for a new generation of precision lethality munitions based on MBX technology. The goal is to develop the technology for future munitions with two key features: increased near field lethality (at the point of target engagement) and virtually zero, far field collateral damage (no fragmentation). Both of these features are critical for enabling discriminant lethality for military operations in urban terrain (MOUT) and close air support (CAS). The focus of the planned work is on understanding the science of MBX technology (material characterization, modeling and simulation, energetics, and target interaction effects). This includes the ability to model and design warheads and munitions fracture, failure, and post-				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603618D8Z Joint Electronic Advanced Technology

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	12.145	10.463	10.838						Continuing	Continuing
P619: Joint Electronic Advanced Technology	12.145	10.463	10.838						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) In the Overseas Contingency Operation, the United States (U.S.) must be ready to meet the widespread and growing threat of Man Portable Air Defense Systems (ManPADS) and other asymmetric threats of portable small weapons improvised from commercially available electronic sensors, computer modules, navigation and control components coupled with widely proliferated explosives, mortars, rockets and small manned or unmanned aircraft. Such devices provide terrorists and foreign military units the novel means to rapidly construct a wide range of weapons capable of disruptive actions against civilian and military forces alike. The U.S. must be ready to counter such weapons on short notice.

(U) The asymmetric nature of such devices is already well understood by terrorists. Improvised explosive devices are in widespread use. ManPADS and mortars have been used to attack both air and ground forces, and pose a threat to any region due to their portability. Unmanned Aerial Vehicles (UAVs) capable of short range operations involving chemical, biological or explosive payloads can be found routinely available through commercial purchase and are easily adaptable to conduct precision attacks for terror purposes using commercial radio control systems. Civil navigation and autopilot devices capable of precisely controlling UAVs can be held in the palm of the hand. Digital processors, analog-to-digital converters and digital optical sensors give terrorists the means to deploy unexpected threats on short notice. Conventional kinetic defenses against these devices can be impractical in urban settings. Because the speed of appearance of these disruptive devices can be short, such threats are asymmetric in comparison with the typical long development cycles associated with U.S. military defensive systems. Together these asymmetries highlight the need to rapidly evolve alternative Electronic Warfare, Information Operations and Counter Terrorism capabilities suitable for neutralizing such threats. This program element will investigate novel means to detect and neutralize these asymmetric threats, as well as methods to employ asymmetric principals against our adversaries.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	12.311	9.320	9.529	
Current BES/President's Budget	12.145	10.463	10.838	
Total Adjustments	-0.166	1.143	1.309	
Congressional Program Reductions				
Congressional Rescissions		-0.057		
Total Congressional Increases		1.200		
Total Reprogrammings				
SBIR/STTR Transfer	-0.141			
Other	-0.025		1.309	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P619, **Advanced Tactical Laser Flashlight Devices**		1.200

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P619: Joint Electronic Advanced Technology	12.145	10.463	10.838						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) The widespread and growing availability of sophisticated, commercially available electronic sensors, computer modules, navigation and control components coupled with widely proliferated Man Portable Air Defense Systems (ManPADS), portable explosives, mortars, rockets and small aircraft provide terrorists and foreign military units with the novel means to rapidly construct a wide range of weapons capable of disruptive actions against military forces. In the Overseas Contingency Operation, the United States (U.S.) must be ready to counter such weapons on short notice. The asymmetric nature of such devices is already well understood by terrorists. Improvised explosive devices are in widespread use. ManPADS, man portable weapons and mortars have been used to attack both air and ground forces, and pose a threat to any region due to their portability. Unmanned Aerial Vehicles (UAVs) capable of short range operations involving chemical, biological or explosive payloads can be found routinely available through commercial purchase and are easily adaptable to conduct precision attacks for terror purposes using commercial radio control systems. Civil navigation and autopilot devices capable of precisely controlling UAVs can be held in the palm of the hand. Digital processors, analog-to-digital converters and digital optical sensors give terrorists the means to deploy unexpected threats on short notice. Because conventional kinetic defenses against these devices can be impractical in urban settings and because the speed of appearance of such devices can be short, such threats are disruptive and asymmetric in comparison with the typical long development cycles associated with U.S. military defensive systems. Together these asymmetries highlight the need to rapidly evolve alternative Electronic Warfare, Information Operations and Counter Terrorism capabilities suitable for neutralizing such threats. This program element will investigate novel means to detect and neutralize these asymmetric threats, as well as methods to employ asymmetric principles against our adversaries.

(U) This program element seeks to identify rapidly deployable solutions (outside of service programs of record) that can effectively mitigate asymmetric threats by integrating advanced commercial or military off-the-shelf technology in innovative ways that augment and/or reduce risk when inserted into service programs of record. Laboratory and field testing will be used to evaluate the feasibility and military utility of resultant low cost, near term capabilities. FY 2010 efforts will investigate, integrate, test and demonstrate elements of the following technologies:

1. Ground based Counter ManPADS concepts and systems that provide area protection in the vicinity of military airports, expeditionary airfields, or other high value locations. A second complete distributed ground based missile warning system will be built and evaluated at a major urban airport to collect clutter data and verify performance enhancements developed in FY 2008 and FY 2009. This missile warning system is being initially integrated with aircraft based countermeasures systems. Potentially viable ground based countermeasures concepts will be evaluated and tested to assess developmental risk. Subsequent efforts will assess integration of ground based missile warning/tracking systems with future ManPADS countermeasures systems.

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2. Low cost, near term technologies to allow Department of Defense aircraft to fly in medium to high Man Portable Air Defense Systems (ManPADS) threat airspace in support of the Overseas Contingency Operation (OCO). Emphasis is on aircraft and system approaches not covered by existing programs of record; including innovative active missile warning, advanced kinetic decoys, data linked warning and countermeasures, and preemptive countermeasures systems. Initial tasks for a full live fire demonstration will be completed.

3. Emerging commercially derived technologies; including rapid prototyping of those required to combat adaptive threats in the OCO including, small Unmanned Aerial Vehicle detection and engagement by kinetic and non-kinetic means. Emphasis will be on demonstrating an end-to-end kill chain and techniques which minimize or eliminate collateral damage. New efforts starting in FY 2010 and FY 2011 will include novel techniques to detect and locate the signatures of terrorist activities using electronic means.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Ground Based Counter-Man Portable Air Defense Systems	1.914	2.300	3.400	
Ground based Counter ManPADS concepts and systems that provide area protection in the vicinity of military airports, expeditionary airfields, or other high value locations. A second complete distributed ground based missile warning system will be built and evaluated at a major urban airport to collect clutter data and verify performance enhancements developed in FY 2008 and FY 2009. This missile warning system is being initially integrated with aircraft based countermeasures systems. Potentially viable ground based countermeasures concepts will be evaluated and tested to assess developmental risk. Subsequent efforts will assess integration of ground based missile warning/tracking systems with future ManPADS countermeasures systems.				
FY 2008 Accomplishments: Accomplishments include thermal signature data that was collected on a representative set of fixed-wing commercial aircraft suitable for Civil Reserve Air Fleet operations; Infrared (IR) sensors were evaluated for missile detection performance and suitability; ground-engagement concepts were modeled and evaluated; integration and tracking software was developed and refined; and detection and tracking performance were evaluated in more than 180 live fire events; and several ground-based directed energy engagement concepts, including the General Dynamics Counter-MANPADs Airspace Protection System (CMAPS), were jointly reviewed with other agencies/industry. The results yielded a one-of-a-kind large, fixed-wing aircraft data base for shared use by Department of Defense and Department of Homeland Security that has been used by United States allies and airport security officials alike; a proven, three-				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
element IR sensor array whose demonstrated performance in a four-pole configuration is capable of exceeding required detection and tracking parameters under constrained launch conditions for all threats tested. An initial live-fire demonstration of the unconstrained CMAPS system configuration combined with directed energy devices to defeat a live-fire missile was accomplished in early FY 2008. *FY 2009 Plans:* Under a Cooperative Research and Development Agreement with Army Research Laboratory and Northrop-Grumman, perform initial testing of a novel ground based countermeasures technique. Follow-on testing will include static testing at a range followed by live fire testing in FY 2010 through FY 2012. Develop proposals for testing the Raytheon Vigilant Eagle high powered microwave airspace protection system in a live fire environment. Other planned accomplishments include thermal signature data collection on a representative set of fixed-wing commercial aircraft suitable for Civil Reserve Air Fleet operations; evaluate Infrared (IR) sensors for missile detection performance and suitability; model and evaluate ground-engagement concepts; develop and refine integration and tracking software; evaluate detection and tracking performance in more than 180 live fire events; and jointly review several ground-based directed energy engagement concepts, including the General Dynamics Counter-Man Portable Air Defense Systems (ManPADS) Airspace Protection System (CMAPS), with other agencies/industry. The results should yield a one-of-a-kind large, fixed-wing aircraft database for shared use by Department of Defense and Department of Homeland Security used by United States allies and airport security officials alike; a proven, three-element IR sensor array whose demonstrated performance in a four-pole configuration is capable of exceeding required detection and tracking parameters under constrained launch conditions for all threats tested. Plan to accomplish a live-fire demonstration of the unconstrained CMAPS system configuration combined with directed energy devices to defeat a live-fire missile. *FY 2010 Plans:* This project integrates netted, ground-based, IR sensor technologies including the Distributed Ground Based Threat Detection System. By combining high-speed, high-resolution tracking mechanisms with either on-board decoys or on-/off-board directed-energy devices, it seeks to demonstrate the end-to-end capability to detect, track, and defeat shoulder-fired, ManPADS known to be in the hands of terrorists in Iraq and elsewhere. Subsequent efforts will complete the assessment of this system and will document				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
performance characteristics for consideration by force protection planners, integrated military base defense experts, and homeland defense officials. FY 2010 will develop a portable missile verification system; test and measure this system for its ability to detect, warn and track other threats such as aircraft, cruise missiles, and Unmanned Aerial Vehicles whose signatures represent a difficult challenge for many conventional weapons systems. FY 2010 will address mobility and militarization of what is initially all commercial off-the-shelf hardware with custom software. Follow-on testing will continue under the Cooperative Research and Development Agreement with Army Research Laboratory and Northrop-Grumman.				
Low Cost/Near Term Counter-Man Portable Air Defense Systems	4.674	2.368	3.004	
Low cost, near term technologies to allow Department of Defense aircraft to fly in medium to high Man Portable Air Defense Systems (ManPADS) threat airspace in support of the Overseas Contingency Operation (OCO). Emphasis is on aircraft and system approaches not covered by existing programs of record; including innovative active missile warning, advanced kinetic decoys, data linked warning and countermeasures, and preemptive countermeasures systems. Initial tasks for a full live fire demonstration will be completed. *FY 2008 Accomplishments:* Accomplishments include: produced a proof of concept event which positively confirmed the ability of the system to defeat a MANPADs under live-fire conditions by automatically remotely triggering flares on drone aircraft. Completed the analysis of previous laboratory, anechoic chamber characterization, and live fire testing of selected components; initially evaluated pyrophoric material effectiveness in a responsive scenario. Published final report on combined active and passive MANPADs testing. United States Marine Corps CH-46 community embraced the concept with a draft Urgent Operational Needs Statement for active missile warning on large helicopters. Completed phase I of a three phase project to combine ground based passive missile warning with a data link to a UH-1Y/AH-1Z equipped with flares. Briefed PMA-276 on plans for a phase II and III. Completed System Requirements Review on a database project based upon our Electronic Warfare database capability to create an IR Countermeasure effectiveness database.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Complete phase II of a three phase project to combine ground based passive missile warning with a data link to a UH-1Y/AH-1Z equipped with flares. Brief PMA-276 on plans for phase III. Produce a proof of concept event which positively confirmed the ability of the system to defeat a Man Portable Air Defense Systems (ManPADS) under live-fire conditions by automatically remotely triggering flares on drone aircraft. Complete the analysis of previous laboratory, anechoic chamber characterization, and live fire testing of selected components; initially evaluated pyrophoric material effectiveness in a responsive scenario. Publish final report on active ManPADS testing. Complete planning for a database project based upon our Electronic Warfare database capability to create an Infrared countermeasure effectiveness database. *FY 2010 Plans:* This project completes ongoing efforts to determine the feasibility of substantially improving the protection of air platforms by combining ground based detection with airborne pyrophoric countermeasures. In FY 2010, Program Element 0603618D8Z will advance this hybrid countermeasure project to demonstrate a tactical data link useable on UH-1/AH-1 platforms of ManPADS detection, tracking, warning and engagement under all-aspect launch conditions and will complete the integration required for a separately funded initial flight demonstration of the integrated system and countermeasures called Aircraft ManPADS Protection System. Air platform protection can reduce false alarm events by combining existing active and passive sensors with advanced sensor fusion software. Current operations have shown that missile detection and warning systems now used by United States and coalition forces are adversely affected by the large number of background events. The technologies under examination use multiple spectrally independent sensors and fusion algorithms, since at least one sensor would always be free of interference, it is estimated that the fusion could reduce false alarms to near-zero levels while retaining exceptionally high threat detection rates. Joint and Allied Threat Awareness System will transition multi-spectral missile warning as part of its System Development Demonstration program. FY 2010 will use measured data to update simulated performance objectives prior to attempting an on-aircraft integration and evaluation; will conclude testing				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
to verify and validate performance and will document results for inclusion in future aircraft force protection programs.				
Disruptive Technology Defeat	5.557	4.595	4.434	
Emerging commercially derived technologies; including rapid prototyping of those required to combat adaptive threats in the OCO including, small Unmanned Aerial Vehicle detection and engagement by kinetic and non-kinetic means. Emphasis will be on demonstrating an end-to-end kill chain and techniques which minimize or eliminate collateral damage. New efforts starting in FY 2010 and FY 2011 will include novel techniques to detect and locate the signatures of terrorist activities using electronic means.				
FY 2008 Accomplishments: Accomplishments include: documented various Unmanned Aerial Vehicle (UAV) signatures, sensors and defeat mechanisms to assess the current range at which such UAVs can be reasonably detected and determined state of the art, unconventional, near-term defeat options, including directed energy options. Hosted premier Counter-UAV event, currently the largest known database for sensor-weapons detection and response capabilities. Addressed risks identified by Defense Science Board, United States Air Force Science Advisory Board, Chief of Naval Operations Deep Blue, and Department of Homeland Security. Completed numerous studies for Office of the Secretary of Defense-Acquisition Technology and Logistics (AT&L), including a congressionally directed helicopter survivability study. Supported the AT&L Joint Analysis Team to provide subject matter expertise for this ongoing study as directed by the Under Secretary of Defense.				
FY 2009 Plans: Host premier Counter Unmanned Aerial Vehicle (UAV) event, nicknamed Black Dart, currently the largest known database for sensor-weapons detection and response capabilities. Document various UAV signatures, sensors and defeat mechanisms to assess the current range at which such UAVs can be reasonably detected and determined state of the art, unconventional, near-term defeat options, including directed energy options. Address risks identified by Defense Science Board, United States Air Force Science Advisory Board, Chief of Naval Operations Deep Blue, and Department of Homeland Security. Complete numerous studies for Office of the Secretary of Defense-AT&L. Provide subject				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
matter technical expertise to the AT&L Joint Analysis Team for this ongoing study as directed by the Under Secretary of Defense. *FY 2010 Plans:* This project will provide expertise to Joint Integrated Air and Missile Defense Organization, jointly with USNORTHCOM, for a variety of United States defense systems to be demonstrated and evaluated in the May 2010 timeframe and to demonstrate an end-to-end kill chain. FY 2010 efforts will be developed in coordination with the defense research community and DIA elements seeking ways to avoid technological surprise. Further efforts will investigate novel means of detecting and locating signatures of terrorist activity, differentiating between terrorist and indigenous activities and providing timely, actionable intelligence that allows asymmetric disruption of terrorist kill chains.				
Advanced Tactical Laser Flashlight Devices *FY 2009 Plans:* United States Army will be the lead for Advanced Tactical Laser Flashlight Devices.	0.000	1.200	0.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603648D8Z Joint Capability Technology Demonstration (JCTD)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	202.976	207.096	198.352						Continuing	Continuing
P648: Joint Capability Technology Demonstration (JCTD)	202.976	207.096	198.352						Continuing	Continuing

Note

The appropriation, Program Element (PE) and Budget Activity (BA) structure for the new JCTD process includes the following:
JCTD PE 0603648D8Z (RDT&E/DW BA-3)
JCTD Transition Funding PE 0604648D8Z (RDT&E/DW BA-4)

In FY 2008 all Advanced Concept Technical Demonstration (ACTD) funding (Program Element (PE) 0603750D8Z) transferred into the Joint Capability Technology Demonstration (JCTD) PE 0603648D8Z. This action completed the transition to the JCTD model that began in the FY 2006 President's Budget. The JCTD Program provides a "cradle to grave" path for transformational joint capabilities. The two JCTD PEs represent a more complex and capable JCTD model. The model contains a JCTD BA3 development arm as well as JCTD BA4 transition arm. Under the JCTD process, the pace of development will accelerate to two-to-three years. Only the JCTDs that demonstrate the highest military utility will be considered for the transition funding in the JCTD BA4 Transition PE (0604648D8Z). Not all JCTDs require transition funding, many projects have a very clear transition path, and however, some projects that demonstrate significant military utility require transition funds to "bridge" them to a program of record. Any remaining ACTD that is completing and shows military utility may receive transition funding. Beginning in FY 2007 and out all new starts are JCTDs only (no ACTDs). In FY 2009 $10.000 million was transferred from the JCTD BA3 PE to the JCTD BA4 PE to increase funding available for assisting the transition of the most promising capabilities. Refer to the specific Budget Exhibit for more details on each funding line.

A. Mission Description and Budget Item Justification

The purpose of the Joint Capability Technology Demonstration (JCTD) Program is to:
- Demonstrate joint solutions to prioritized Combatant Commander (CoCom) capability gaps.
- Speed solutions to warfighters with spiraled technologies and complete demonstrations in 18 to 36 months.
- Enable strategic and operational CoCom challenges to become available inside traditional two-year programming/budgeting processes.

The JCTD Program was redesigned in FY 2006 from the Advanced Concept Technology Demonstration (ACTD) Program. The Department initiated thirty-four (34) JCTDs from FY 2006 through FY 2008 and will initiate up to twelve immediate and rolling new start JCTDs in FY 2009.
- The JCTD model is designed based on DoD, Government Accountability Office (GAO), and Congressional recommendations over the past three years.

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- The tenants of the JCTD model provide increased funding in the first two years of the demonstration effort to accelerate completion with "transition" funding available for projects that prove significant military utility.
- Program goals include: Spiraling products and deliverables; Operational Utility Assessment (OUA) complete within 36 months; and 80 percent of the JCTDs transition products to fielded capability sustainment and/or a program of record (POR).
- The JCTD business model explicitly calls attention to the needs of the joint warfighter through the U.S. Combatant Commands, while garnering JROC validation through the Joint Staff Joint Capability Integration Development System (JCIDS) process.
- The JCTD program provides flexibility through immediate and rolling new starts to address the most urgent U.S. Combatant Commanders needs.
- FY 2009 supports 58 active projects: 13 continuing ACTDs; 33 prior year JCTDs; and 7 new start JCTDs; includes an estimate of five potential rolling starts.
- Presidents Budget FY 2010 supports 49 active projects: 2 continuing ACTDs; 29 prior year JCTDs; includes 8 (estimated) FY 2010 immediate and 5 (estimated) rolling start new start JCTDs to be selected in June 2009.

MEASURABLE OUTCOMES: The JCTD model is capability based, not threat based, serving U.S. Combatant Command priorities by focusing on near-term joint needs. Stated metrics include: 25 percent of JCTDs will provide an operationally relevant product demonstration within 24 months and 75 percent will complete final demonstration within three years of Implementation Directive signature. JCTDs spiral products and deliverables and 80 percent of JCTDs transition at least 50 percent of their products to sustainment. Since inception in 2006 the JCTD program is exceeding all metrics including faster completion times and increased transition rate to Programs of Record (PORs).

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	202.484	206.337	201.975	
Current BES/President's Budget	202.976	207.096	198.352	
Total Adjustments	0.492	0.759	-3.623	
Congressional Program Reductions		-7.000		
Congressional Rescissions	-0.405	-1.141		
Total Congressional Increases		8.900		
Total Reprogrammings	5.150			
SBIR/STTR Transfer	-4.253			
Other			-3.623	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P648, **Distributed Network Switching (DNS)**		2.000

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Congressional Increase Details ($ in Millions)	**FY 2008**	**FY 2009**
Congress appropriated funds to integrate a maturing high-speed optical switching capability combined with a networking appliance that enables to masking of network media access control addresses. The outcome of DNS is to develop and demonstrate a stealth core backbone network for interoperable IP-based, high-capacity data transfer through secure networking functionality more immune to cyber-attack.		
Project: P648, **Maritime UAS Demonstration for the SOUTHCOM Region** Demonstrate current "off-the-shelf" Medium Altitude Long Endurance (MALE) Unmanned Air System (UAS) to support counter illicit trafficking and maritime domain awareness operations in the SOUTHCOM Area of Focus (AOF). Intent is to provide a evaluation OCONUS in the SOUTHCOM AOF in real world operations, integrated with ongoing efforts under Tactical Control (TACON) to the Joint Interagency Task Force South (JIATF-S). US SOUTHCOM will work in conjunction with the Counter Narcotics Terrorism Program Office (CNTPO) to advertise an open competition for any UAS MALE system to demonstrate effectiveness of real time detection and monitoring of air, land and maritime targets associated with illicit traffickers		3.000
Project: P648, **Simultaneous Field Radiation Technology (SFRD)** Congress appropriated funds to apply emerging research to a new type of antenna for use on radio-frequency (RF) communications devices. The emergent research proposed use of cylindrical RF antenna forms to reduce antenna profile and length while improving antenna gain. The outcome of Simultaneous Field Radiation Tech (SFRT) is to develop and demonstrate improved antennas for tactical radios in the High Frequency, Very high Frequency and Ultra High Frequency radio bands. The capabilities proposed for development in this technology program will improve communications capabilities while reducing antenna visibility. Navy is participating in developing and demonstrating the new antenna functionality. The primary outputs and efficiencies to be demonstrated are improved tactical communications. SFRT output is certified antennas for at least two classes of tactical radios. The efficiency is that mobile users will have improved communications while enjoying more covert antenna profiles.		2.300
Project: P648, **Spartan Advanced Composite Technology** Spartan is a modular, multi-mission, unmanned surface vehicle (USV) used to deploy sensors and weapons as low-cost force multipliers with integrated expeditionary sensor and weapon systems for use against asymmetric threats. The expanded range provides a layered defense, early warning/intercept capability for incoming threats, thereby improving protection of surface combatants and noncombatants. Missions - 1) Conduct critical missions Antisubmarine Warfare (ASW); Mine Warfare (MIW); Intelligence, Surveillance, and Reconnaissance/Force Protection/precision Engagement (ISR/FP/PE); 2) Prepare the		1.600

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Congressional Increase Details ($ in Millions)	**FY 2008**	**FY 2009**
waterspace for Amphibious and Sealift Ops; and 3) Provide port-protection when launched/operated from shore. These funds are to develop composite technologies for Spartan.		

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603648D8Z Joint Capability Technology Demonstration (JCTD)					**PROJECT NUMBER** P648	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P648: Joint Capability Technology Demonstration (JCTD)	202.976	207.096	198.352						Continuing	Continuing

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- Speed solutions to warfighters with spiraled technologies and complete demonstrations in 18 to 36 months.
- Enable strategic and operational CoCom challenges to become available inside traditional two-year programming/budgeting processes.

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- The JCTD model is designed based on DoD, Government Accountability Office (GAO), and Congressional recommendations over the past three years.
- The tenants of the JCTD model provide increased funding in the first two years of the demonstration effort to accelerate completion with “transition” funding available for projects that prove significant military utility.

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• Program goals include: Spiraling products and deliverables; Operational Utility Assessment (OUA) complete within 36 months; and 80 percent of the JCTDs transition products to fielded capability sustainment and/or a program of record (POR).
• The JCTD business model explicitly calls attention to the needs of the joint warfighter through the U.S. Combatant Commands, while garnering JROC validation through the Joint Staff Joint Capability Integration Development System (JCIDS) process.
• The JCTD program provides flexibility through immediate and rolling new starts to address the most urgent U.S. Combatant Commanders needs.
• FY 2009 supports 58 active projects: 13 continuing ACTDs; 33 prior year JCTDs; and 7 new start JCTDs; includes an estimate of five potential rolling starts.
• Presidents Budget FY 2010 supports 49 active projects: 2 continuing ACTDs; 29 prior year JCTDs; includes 8 (estimated) FY 2010 immediate and 5 (estimated) rolling start new start JCTDs to be selected in June 2009.

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Actionable Situational Awareness Pull (ASAP)	0.600	0.000	0.000	
The Joint Requirements Oversight Council (JROC) validated the need for capability from ASAP as a FY 2005 new start ACTD. ASAP developed, integrated, demonstrated and transitioned software that provides a "Smart Pull" capability to the tactical, operational and/or strategic user on the Global Information Grid (GIG) for accessing critical situation awareness information resident on distributed databases. Utilizing the Net-Centric Enterprise Services (NCES) core service architecture and the Net-Enabled Command Capability (NECC) framework, a "Smart Pull" service was demonstrated operationally and transitioned into a pre-NECC capability module and the Integrated Broadcast System (IBS). ASAP outputs and efficiencies include (1) increased availability of useable data for a user, (2) increased performance through decreased latency of data, (3) increase in data obtained via "pull" vice "push" procedures, and (4) increased interoperability with coalition forces by use of XML Common Message Format Standards. Efficiencies include response time performance on the return of data as a web service. Transition: Software tools and documentation have transitioned to pre-Net-Enabled Command Capability (NECC) and the Integrated Broadcast System (IBS). The ASAP User Sponsor was the U. S. Pacific Command (PACOM) and the lead service/agency was the Defense Information Systems Agency (DISA).				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: - FY 2008 Output - Finalized CONOPS and Tactics, Techniques, and Procedures, training package and DOTMLPF change recommendations. Completed transitioning ASAP ACTD products. Completed the ACTD.				
Adaptive Planning Pilot (APP) The Adaptive Planning Pilot JCTD is a rolling start in FY 2008. The outcome of the APP JCTD is to provide Combatant Commanders with urgently needed dynamic and agile planning capabilities as outlined in the Adaptive Planning Road Map II. The APP JCTD will provide vitally needed strategic guidance tools for Adaptive Planning and Execution (APEX) users concurrently with the rollout of NECC Increment I. The APP JCTD is a three-year project under the sponsorship of Joint Forces Command and U.S. Force Korea and will be used to provide early capability to planners by providing additional services to Increment I that are not present in the GCCS Migration of (legacy) Systems. The JCTD is also used as a risk mitigation tool for the NECC program by providing valuable lessons learned from the FDCE development approach. Completion of development and demonstration is planned for 2010. The lead service is Army and the transition manager is the NECC Joint Program Office. The primary output will be the ability of COCOM and Joint Staff planners to conduct parallel, collaborative planning with subordinate elements and with members of the Joint Planning and Execution Community (JPEC). *FY 2009 Plans:* - FY 2009 Planned Output - Spiral 1 technical demonstration strategic guidance services *FY 2010 Plans:* - FY 2010 Planned Output - Spiral 1 operational demonstration, develop Spiral 2 and Spiral 3 technical demonstration	0.000	2.800	2.000	
Advanced Distributed Aperture System (ADAS) The Joint Requirements Oversight Council (JROC) validated the capability need for ADAS as an FY 2008 new start. The outcome of ADAS is to demonstrate and assess the military utility of a multi-spectral suite of sensors on an H-60 aircraft to provide full spherical imagery to aircrew members via head-tracked	6.000	5.000	5.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
helmet mounted displays with day/night pilotage, heads-up display with navigational/flight symbology data, multi-band threat laser warning, weapons symbology, partial brownout solution, and some hostile fire indications and friendly/enemy aircraft tracking information enhance aircraft survivability and aircrew situational awareness. During the developmental phases, ADAS Concept of Operations (CONOPS) and Tactics, Techniques, and Procedures (TTPs) will be developed and refined. ADAS is a three-year project under the Combatant Command (CoCom) sponsorship of U.S. Special Operations Command (USSOCOM) with completion of development and demonstration by end of FY 2010, based on release of funds. If the ADAS JCTD shows sufficient military maturity and utility, it will transition to a Program of Record (POR) under the USSOCOM Program Executive Officer for Rotary Wing by FY 2011. The U.S. Army is the lead service. The primary outputs and efficiencies to be demonstrated in the JCTD Military Utility Assessment are: 1) Increased survivability of Special Operations Aviation (SOA) forces; 2) Increased capability for SOA forces during Direct Action (DA) missions; 3) Enhanced capabilities for SOA forces to move and identify targets in low/no-light environments; 4) Enhanced capabilities for SOA forces to move and identify targets in urban/restrictive terrain. *FY 2008 Accomplishments:* First prototype-baseline, prepared assessment plan with Operational Manager. Implementation Directive signed and approved by all stakeholders. Draft Management Plan and Transition plan. *FY 2009 Plans:* Complete baseline development and system hardening. Draft integration plan onto aircraft. Complete transition plan, and assessment plan for the final Military Utility Assessment. *FY 2010 Plans:* Complete Military Utility Assessment, begin transition to PEO Rotary Wing. Complete transition to PEO Rotary Wing. ADAS JCTD scheduled completion date is December 2010.				
Agile Rapid Global Combat Support (ARGCS) The Joint Requirements Oversight Council (JROC) validated the capability need for ARGCS as an FY 2004 start which is using advanced technologies to demonstrate a family of testers for electronic	0.750	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
components and provide unprecedented interoperability between weapon systems, Services, and levels of maintenance. This will reduce costs and the proliferation of testers while improving the availability and performance of weapon systems. In addition, ARGCS will demonstrate technologies to facilitate net-centric diagnostics by capturing historical logistics data and developing an expert support system that will further reduce repair times and costs, as well as future sparing requirements. Outputs and efficiencies will include increases in performance, test accuracy, interoperability, reduced logistics and weapon system support costs, and reduced proliferation of automatic test systems in the future. Technologies demonstrated will reduce the time to field new tester, a reduction in the time to diagnose and repair, a reduction in proliferation of test systems, and a reduction in the logistics footprint. The ARGCS technology will be transitioned to the Services through existing automated test programs of record. The user sponsor is U.S. Pacific Command and the lead service is the Navy. *FY 2008 Accomplishments:* Completed project documentation and final report. Supported transition of ARGCS technologies to Services and continued Joint Capabilities Document (JCD) development that guide the future direction of automatic test systems. JCD focused on net-centric diagnostics and interoperability within and between Services.				
Airborne Weapons Surveillance System (AWSS) The Joint Requirements Oversight Council (JROC) validated the capability need for AWSS as an FY 2007 new start. Funding was secured and planning finalized for FY 2008 start. The output of AWSS will be demonstration of a capability to immediately detect enemy artillery, rocket, and mortar fires, classify those fires, and relay locations of enemy firing units to coalition counter-fire systems. The JCTD will use advanced staring non-imaging infra-red wide field-of-view detectors, together with electro-optic video, aboard unmanned air vehicles. The efficiencies of the AWSS system will be (1) percent of detections of artillery fires at ranges of 20 km or greater, (2) location accuracy of hostile firing units, and (3) transmission time of hostile fires and hostile firing locations to coalition counterfire units, in efficient machine readable formats. The sponsor of AWSS is U.S. Pacific Command, and Republic of Korea is the coalition partner. Operational management is from Commander US Forces Korea and Republic of Korea Army. Technical lead is Army Aviation & Missile Research, Development and Engineering Center, and transition lead is	0.800	3.900	1.642	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Army Program Manager Unmanned Air Systems. Technical demonstrations will occur in the US using US Army manned and unmanned air vehicles, with operational assessment in forward areas using a Republic of Korea unmanned air vehicle. *FY 2008 Accomplishments:* Project Agreement with Republic of Korea negotiated by US Army International Programs. Developed Concepts of Operations and Tactics, Techniques, and Procedures. Integrated sensor/processor into form factor required for unmanned air systems. *FY 2009 Plans:* Complete component testing. Integrate payload into unmanned air systems. Conduct laboratory and field trials. Conduct military utility assessment. *FY 2010 Plans:* Deliver residual capability to Combined Forces Korea. Integrate refinements identified in utility assessments. Refine concepts of operations. Support residual operations.				
CORPORAL The Joint Requirements Oversight Council (JROC) validated the need for CORPORAL capabilities as a FY 2008 new start. The output of CORPORAL will be to provide ground-based, deployed Marines and Soldiers with the capability to take full advantage of tactically relevant sensor data, Command & Control (C2), and Electronic Attack (EA) in near real time. Specifically, Non-Traditional ISR (NTISR) "on-demand" to the ground unit; beyond Line of Sight connectivity maximizing opportunity for collaboration or synchronization; distributed operations demand faster responses and necessitate providing greater capability to existing aircraft rather than introducing new aircraft; greater joint service capacity from existing and planned EA assets and platforms. The efficiencies of the CORPORAL JCTD will be to decentralize the data to share openly across systems allowing airborne and ground-based tactical systems to be connected. The result is a greatly improved/ expanded communications range and availability so that critical data/information can be shared with other	5.500	5.500	2.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
warfighters allowing collaboration and visibility to higher authorities. This will provide the ground forces with a beyond-line-of-sight (BLOS) connectivity to ISR resources (traditional and non-traditional) that they do not have today. This JCTD will provide a collaborative distributed data and information exchange framework based on existing and planned warfighters' communication waveforms. CORPORAL is a three-year project sponsored by US Central Command with a planned transition by the Marine Corps in 2011. *FY 2008 Accomplishments:* Combat Information Network Application Systems (CINAPS) capability was delivered in September 2008. Technical Demonstration # 1 was conducted in September-October 2008. This was a major part of Spiral 1 and has dovetailed to work already started for Spiral 2. *FY 2009 Plans:* Limited Utility Assessment (LUA) is being conducted in September 2009 at a Weapons and Tactics Instruction exercise at Marine Corps Air Station, Yuma, AZ. At the LUA CORPORAL will demonstrate the networking capability provided by CINAPS on board an EA-6B, FA-18; and an AV-8B. The LUA is also demonstrating the commander workstation capability as well utilize an unmanned aerial vehicle to provide imagery data on the CORPORAL network. Additionally the LUA is incorporating the Intrepid Tiger program as a node on the CORPORAL network and thus an accessible asset to the warfighter. The LUA marks the end of Spiral 1. *FY 2010 Plans:* Technical Demonstration # 2 will be conducted demonstrating the Electronic Attack capability of CORPORAL. technical Demonstration # 3 will be conducted in December 2010 as a dress rehearsal for the Military Utility Assessment (MUA) that will be conducted in April 2011 at a Weapons and Tactics Instruction exercise at Marine Corps Air Station, Yuma, AZ. At TD # 3 and the MUA we will demonstrate the entire CORPORAL capability. This includes the networking, electronic attack, electronic warfare systems architecture, and electronic attack services capabilities. The MUA will mark the end of Spiral 2. Begin transition of CORPORAL to PMA-234. Complete transition to PMA-234. The CORPORAL JCTD scheduled completion date is June 2011.				
Chemical Unmanned Ground Reconnaissance (CUGR)	1.700	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Joint Requirements Oversight Council (JROC) validated the capability need for CUGR as an FY 2005 new start. The outcome of CUGR is to provide manned nuclear, biological and chemical (NBC) reconnaissance units with two new technology applications to be demonstrated in the Joint Service Light NBC Reconnaissance System's (JSLNBCRS) High Mobility Multipurpose Wheeled Vehicle (HMMWV) variant providing an unmanned capability. The first of these new systems (Thrust One) will replace the Double Wheel Sampling System (DWSS), currently in use, with a mobile Mass Spectrometer, using RAMAN technology, called the Joint Contaminated Surface Detector (JCSD). Since the DWSS can only be used when the vehicle is moving at a fast walk, replacing it with the JCSD, which is producing reliable results at maximum vehicle speed, greatly increases mobility and flexibility for these units. The second technology (Thrust Two) is the incorporation of a small, remote controlled, sensor-equipped robot to be the recon crew's "point man" in high risk contamination reconnaissance. The robot is called the CUGR Unmanned Ground Vehicle (CUGV). The efficiency of CUGR will be to utilize a machine rather than put a soldier at risk. CUGR addresses the capability gaps identified in the CBRN Baseline Capability Assessment, the JRO-CBRN Defense Mobilization Plan, and the supporting JCIDS Functional Area Analysis. Thrust One will transition as part of the Reconnaissance and Platform integration sensor block upgrade program and replace DWSS on Stryker, HMMWV and LAV vehicles. Thrust Two will become part of the Joint CBRN Dismountable Reconnaissance System (JCDRS). DTRA provides overarching program management. The Technical Manager is the U.S. Army Research, Development and Engineering Command's Edgewood Chemical and Biological Center. The Joint Program Executive Office for CBD assigned the Joint Product Manager for NBC Reconnaissance as the Transition Manager. The U.S. Pacific Command is the ACTD sponsor with Operational Manager responsibility with the U.S. Army Pacific who is providing the 95th Chemical Company as the ACTD demonstration unit. ACTD will complete in FY 2007. Outputs will be: to increase maneuver speed to 45 kph vice 11-22 kph: allow detection/identification of various classes of substances simultaneously vice one at a time; reduce mission consumables; enable reconnaissance into areas that otherwise would be inaccessible by manned vehicles; can be deployed into hazardous environments; offer a point detection capability; and provide the ability to collect liquid, solid and aerosol samples.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: CUGV Military utility Assessment completed, system assessed ready for transition. Six CUGV systems delivered for residual use and for development of System Performance Specification for the Joint NBC Reconnaissance System Increment 2 Program. Funding for CUGV integration is programmed. JCSD efforts focused on integration into the Stryker NBC Reconnaissance Vehicle, with integration and test funded by Program of Record. Effort will define technology readiness and System Performance Specification for the Stryker NBCRF Product Improvement Program. Completed the ACTD.				
CoCom Direct Support, Pre-Transition and Classified Programs	19.961	22.672	23.000	
The JCTD Direct Program Support is comprised of four programs broken-out separately from the specific JCTDs projects. The direct funding line is used to provide support for the entire JCTD program (versus individual JCTDs). These four programs include (1) Unified Combatant Commander (CoComs); (2) JCTD Pre-Transition Support; (3) Interagency Classified Projects, and (4) Joint enabling technologies that are either directed by Congress or initiated by DUSD (AS&C). 1) Unified Combatant Commander (UCC) Direct Support: The CoComs play an essential role in the selection, validation, demonstration, and transition of JCTDs. The focus of JCTDs is to directly fill joint CoCom/coalition capability gaps. Many JCTDs have funding allocated for the CoComs from within their specific program funding lines. Additionally, in previous years DUSD (AS&C) would attempt to provide direct ACTD support from OSD if resources became available. This direct support allows for a timely allocation of resources to the CoComs, based on the number of JCTD projects being sponsored and the intensity of effort required. The Department also envisions that the CoComs will play a greater role in the development, support and coordination of JCTDs that are coalition oriented (within their specific AOR). 2) JCTD Pre-Transition Support: The JCTD program has been highly successful in rapidly developing and demonstrating new technologies and complementary concepts of operations for the warfighter. In order to successfully transition more JCTDs to the warfighter, the SECDEF established the goal of increasing the number of JCTDs evolving into formal acquisition programs. In order to enhance this transition effort and to respond to GAO recommendations in earlier years, the JCTD program continues to support a pre-transition line in the JCTD budget submission.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
3) Special Capabilities Office (SCO)/Interagency Classified Support for JCTDs: JCTDs also support a limited number of classified efforts which are coordinated with other agencies and detailed in separate DoD budget exhibits. 4) Joint Enabling Technologies: Over the past several years' congressional committees have highlighted the potential of mature, joint technologies and provided resources to the JCTD program to investigate the military utility of these technologies. DUSD (AS&C) also becomes aware of promising technologies which may have transformational application to JCTDs. The need for these technologies may be realized until an JCTD is mid-way through its development or after a final demonstration. In most cases, these enabling technologies have broader application across several functional capabilities addressed by various JCTDs. *FY 2008 Accomplishments:* Unified Combatant Commander (UCC) Direct Support: Vetted over 60 CoCom potential project candidates for selection, validation, demonstration, and transition of JCTDs. 2) JCTD Pre-Transition Support: Special Capabilities Office (SCO)/Interagency Classified Support for JCTDs: Supported several classified efforts coordinated with other agencies and detailed in separate DoD budget exhibits. *FY 2009 Plans:* Liasion and review with CoComs and Coalition high leverage, joint urgent requirements for possible candidate. Support SCO office in demonstration of classified technology capabilities. *FY 2010 Plans:* Liasion and review with CoComs and Coalition high leverage, joint urgent requirements for possible candidate. Support SCO office in demonstration of classified technology capabilities.				
Coalition Joint Spectrum Management and Planning Tool (CJSMPT) The Joint Requirements Oversight Council (JROC) validated the requirements for the capabilities needed from CJSMPT for an FY 2006 new start. The outcome of CJSMPT is force structure driven coordination of friendly force communications and counter-Improvised Explosive Devices (C-IED) jammers through	0.600	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
software based spectrum management tools to enable the Warfighters to synchronize electromagnetic spectrum allocation and usage more effectively and efficiently. CJSMPT is a three year project under the sponsorship of US European Command with direct engagement by US Central Command, and included phased software deliveries and demonstrations in FY 2007 and FY 2008. The US Army is the technical lead Service for the JCTD and had agreed to sustain the delivered capability in the USEUCOM and USCENTCOM theaters until transition of the initial capabilities to the Defense Information Systems Agency (DISA), the lead Agency for the Global Electromagnetic Spectrum Information System program. The primary output and efficiencies demonstrated in the JCTD Military Utility Assessment in FY2009 are (1) interfaces to currently disparate and isolated data bases into a virtual knowledge repository, (2) interactive emitter, receiver and terrain models permitting user visualization of spectrum usage, and (3) spectrum use plans for operational coordination, scenario development and course of action evaluation. *FY 2008 Accomplishments:* Refined phase one software capability, expanded to additional friendly force spectrum usage beyond C-IED coordination. Services' spectrum managers engaged in advising the technical lead on tool suite refinements including integration of spectrum coordination procedures. US Army expanded mobile training, classroom instruction and doctrine for spectrum coordination with relevant operational scenarios. Conducted Joint Military Utility Assessment of capabilities delivered in early FY 2009: delay from original schedule was a result of necessary modifications identified by early user trials. Finalized sustainment activities within US Army, and transition documentation with DISA. Completed the development of CJSMPT software capability and demonstrations by March 2009. Completed the JCTD, with sustainment of functionality by US Army.				
Coalition Mobility System (CMS) The Joint Requirements Oversight Council validated the capability need for CMS as an FY 2007 new start. The outcome of CMS is to develop the capability for rapid coordination of coalition movement execution. CMS will integrate selected, operationally relevant data from U.S. systems with data sources used by coalition partners to establish a working coalition environment, which meets the needs of U.S. and CTF decision makers. The primary outputs and efficiencies to be demonstrated in the JCTD are: 1) U.S. operators gain access to coalition movement data (military and commercial) using familiar U.S.	3.021	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
national systems (Single Mobility System, Global Transportation Network, etc.), 2) Supports the Common Operating Picture for Deployment & Distribution (COP D2), 3) Coalition partners and CTF staff gain access to selected, operationally relevant information on U.S. and coalition airlift, sealift, road, and rail movements (military & commercial) supporting coalition activities. CMS is a 4-year project co-sponsored by US Pacific Command (USPACOM) and US Transportation Command (USTRANSCOM). Key participants include the Quadripartite Logistics Forum consisting of Australia, Canada, United Kingdom, and the United States. Initial capabilities were demonstrated in FY 2007, with full-scale multinational demonstrations on a coalition network in FY 2008. Multimodal, multinational movements are planned in FY 2009. USTRANSCOM is the Transition Manager and transition activities began in FY 2008. *FY 2008 Accomplishments:* Identified the existing US SMS data elements to be made available in CMS; identified appropriate queries for use by CMS users; adjusted the coalition data format as required to ensure operational efficiency; addressed policy, technical and operational issues associated with replicating SMS data in a CMS data server; defined report formats for CMS users and identified existing SMS functionalities available in the CMS application; operationally hardened the Phase I prototype; designed and implemented an electronic data interface (EDI) which allowed the acceptance of properly formatted coalition partner information into the CMS database; determined, designed and delivered CMS reports in coalition-preferred format; operationally tested the ability of CMS to provide coalition data to SMS; operationally tested the ability of CMS to export data; integrated CMS into the Coalition Theater Logistics (CTL) portal v2.0; conducted an appropriate Limited Operational Utility Assessment (LOUA) utilizing an Independent Test Agent not affiliated with product development; completed an LOUA employing the Internet. Spiral Output _ the execution software was successful and in the field two years early providing valuable if limited capability to USCENTCOM and 8 nations. FY 2009 output funded with two FY 2008 funding - Develop additional capabilities as identified in the Functional Requirements Document, integrate CMS into the Coalition Theater Logistics (CTL) portal v3.0; finalize CONOPS documentation; complete DOTMLPF Change Recommendation, conduct Final OUA; codify functional requirements not addressed during JCTD development. Transition Manager is USTRANSCOM. Funding from TRANSCOM partnership sustains these activities in FY 2009 and 2010. CMS to USTRANSCOM as a new Program of Record in FY 2010.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Coalition Secure Management and Operations System (COSMOS)	1.900	1.900	0.000	
The Joint Requirements Oversight Council (JROC) validated the multinational information sharing requirements and capabilities to be delivered by COSMOS for a FY 2005 new start. The COSMOS ACTD outcome was to be a pilot implementation of the Multilateral Interoperability Program (MIP) specifications for C2 data sharing (specifically the Command and Control Information Exchange Data Model (C2IEDM) and the associated Information Exchange Mechanism (IEM)) in the Combined Enterprise Regional Information Exchange System (CENTRIXS) coalition network environment. COSMOS conducted a final demonstration of foundational capability in CY 2008. The expected output was identification of necessary and sufficient conditions for implementing the MIP specifications with policy-based information sharing operational rules and security enforcement. COSMOS was expected to lead to rapid, secure protected sharing of critical C2 information to and among coalition partners' organic command and control (C2) systems on a single and secure integrated coalition network. The projected efficiencies included substantial reduction of textual message exchange needed for shared situational awareness among coalition commanders, improved collaborative decision making, reduced confusion, uncertainty and delay in combat and crisis operations, and effective bridging of coalition sourced information with US Global Information Grid (GIG) Network Centric Enterprise Services (NCES). Transition to programs of record was planned for FY 2009, targeting the emerging Multinational Information Sharing (MNIS) initiatives. Projected sustainment of the demonstrated capabilities by DISA through FY 2009 is doubtful because maturity of the operational concepts and technologies required did not evolve as rapidly as expected. COSMOS was to be a three year ACTD co-sponsored by U. S. Pacific Command (PACOM) and U. S. European Command (EUCOM). The Defense Information Systems Agency (DISA) was the lead agency.				
FY 2008 Accomplishments: Technology evolution required migration to the MIP Joint Consultation, Command and Control Information Exchange Data Model (JC3IEDM) to conform to US ratification of NATO Standardization Agreement (STANAG) 5525 as foundation for tools and information sharing. Preliminary capability was demonstrated in a Military Utility Assessment (MUA) at the end of CY2008. The ACTD development activity completed in FY 2008.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: The COSMOS ACTD demonstrats the concepts for selected, protected, policy-based information sharing among coalition partners (Canada, United Kingdom and Australia. Singapore observed). Transition into US Marine Corps Marine Air Ground Task Force Command and Control Command Operations Center for data interoperability between Marine forces and US Army and selected coalition partners. Complete the ACTD.				
Combat Autonomous Mobility System (CAMS) The Joint Requirements Oversight Council (JROC) validated the capability need for CAMS as a FY 2008 new start. Special Operations Forces (SOF) are operating for extended periods in wide ranging, austere, non-permissive areas against larger forces; all with resource constrained manpower. The CAMS JCTD output will provide robust organic capability to conduct: timely Intelligence, Surveillance, and Reconnaissance (ISR); Command and Control of multiple assets over extended distances; and automated mobility in support of SOF mission profiles. The system will employ mature sub-components to extend ISR range and targeting coverage, improve Joint fires support, C2 multiple unmanned ground and air systems, and provide automated support for multiple SOF mission profiles. The CAMS JCTD efficiencies will integrate ground-based autonomous technology to leverage current SOF manpower. In short, CAMS will provide the technology to force multiply the available manpower. *FY 2008 Accomplishments:* Implementation Directive, Management and Transition Plan, CONOPs, Integrated Assessment Plan, TLOE #1, and built platforms. *FY 2009 Plans:* Deliver Platforms, Demonstration #1, and Interim Operational Utility Assessment. FY 2010 activties funded with "two year" FY 2009 funds and project partnerships - TLOE #2, Demonstration #2, Final Operational Utility Assessment and Extended User Eval. Transition Strategy - CAMS technology will transition to Program Executive Office - SOF Warrior. Robotic Systems Joint Program Office is postured to manage the USSOCOM Program of Record.	4.610	5.100	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Communications Air-Borne Layer Expansion (CABLE)	4.800	4.800	4.300	
The Joint Requirements Oversight Council (JROC) validated the need for CABLE as an FY08 new start. The outcome of CABLE is to demonstrate airborne networking for tactical Joint, Interagency, Intergovernmental and Multi-National (JIIM) users who lack mobile and dynamic connectivity throughout the full range of operations. CABLE will enable interoperability between air, land, and maritime domain communication systems; enable robust information sharing; and provide strategic communications reach back in an austere or over-subscribed SATCOM environment. Transition to the Service Programs of Record (POR) in FY 2011. Outputs and efficiencies to be demonstrated in include (1) seamless interconnection of multiple air, maritime and land network coverage areas supporting voice and data, (2) cross-band and multi-domain connectivity within and between coverage areas through IP routing, (3) the extension of command and control connectivity throughout the full range of operations, and (4) enhanced network services for voice, video and data communications over a common IP network. U.S. Strategic Command (USSTRATCOM) and U.S. Joint Forces Command (USJFCOM) are the sponsors. US Navy and US Air Force are lead Services.				
FY 2008 Accomplishments: Completed the JCTD governing documentation and inter-Service requirements and interface definitions. Developed the initial Operational and System Architecture. Reviewed JEFX08/ Objective Gateway performance for CABLE CONOPS insights. Performed laboratory experiments focusing on high capacity backbone communications capabilities for potential CABLE solutions.				
FY 2009 Plans: Conduct demonstrations of prototype technologies for tactical edge access and forward tactical services and applications. Fabricate, integrate and conduct flight testing of CABLE prototypes. Complete first phase planning for operational demonstrations and Operational Utility Assessment.				
FY 2010 Plans: Complete operational Concept for Employment. Conduct the operational demonstration and Operational Utility Assessment. Begin transition to the Services' PORs. Transition Manager is Air Force Global Cyberspace Integration Center.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Comprehensive Maritime Awareness (CMA)	5.000	0.000	0.000	
The Joint Requirements Oversight Council validated the capability need for CMA as an FY 2006 new start. The outcome of CMA is demonstration and transition of technologies and operations concepts showing the value of information sharing and effective information management for improving global Maritime Domain Awareness. CMA will demonstrate the value of both interagency and international (Republic of Singapore) information sharing. CMA will demonstrate data management techniques such as automated anomaly detection and threat evaluation, and application of the Department of Defense Net-Centric Data Strategy. CMA is a 4-year project sponsored by U.S. Pacific Command, U.S. Northern Command, and U.S. European Command. Initial capabilities were demonstrated and operated in FY 2007, with advanced capability spirals later in FY 2007 through early FY 2009, and transition support in FY 2009. The lead Service is U.S. Navy. The primary outputs and efficiencies to be demonstrated in CMA Military Utility Assessments are (1) percent increase in the number of maritime tracks and identified tracks in U.S. military, interagency, and coalition maritime operational pictures; (2) percent increase in numbers of maritime contacts with amplifying information (such as crew list, cargo manifest, port-of-call history, etc.); (3) percent increase in numbers of vessels of interest monitored by maritime intelligence analysts; (4) number of automated anomaly detections and threat alerts provided to maritime intelligence analysts; (5) increase in number of agencies (U.S. and international) engaged in information sharing across a common service oriented architecture.				
FY 2008 Accomplishments: Operated FY 2007 and early FY 2008 spiral capabilities at key maritime analysis nodes (Maritime Intel Fusion Center Atlantic, Maritime Intel Fusion Center Pacific, National Maritime Intelligence Center, PACFLT HQ, USNORTHCOM HQ, others). Integrated additional capabilities based upon additional data sources, including interagency data, and threat assessment capabilities. Executed two additional operational demonstrations and interim utility assessments. Supported transition to US Navy and US Coast Guard programs. FY 2009 activties funded with "two year" FY 2008 funds and project partnerships - Completed integration of net-centric services. Conducted final operational demonstration and complete military utility assessment. Supported transition to US Navy and US Coast Guard programs. Estimated to complete the JCTD in FY 2009.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Counter Bomb/Counter Bomber (CB2)	0.500	0.000	0.000	
The Joint Requirements Oversight Council (JROC) validated the capability need for CB2 as a FY 2003 new start. The outcome is to provide improved capabilities for military installations against the threat posed by terrorist delivered bombs and improvised explosive devices (IEDs). The capabilities include technologies for detection, identification, mitigation, and command/ control/ communications (C3); along with tactics, techniques, and procedures, and concepts for operations. The sponsoring Combatant Commands (CoComs) are USSOUTHCOM and USEUCOM. Other organizations involved as participants, users of capabilities, and/or observers include USCENTCOM, Department of Homeland Security, and US Coast Guard. The lead service is the U. S. Navy. The primary outputs to be demonstrated to the users and evaluated in the Military Utility Assessment (MUA) are 1) ability to perform surveillance on the movements of people and vehicles near the installation as possible precursor to the threat, 2) detection and identification of the threat device prior to blast, 3) mitigation of the bomb, and 4) C3 to tie together the people, systems, and data critical to the accomplishment of the mission. The efficiencies to be gained are 1) the ability to perform an important and increasingly critical mission that had little priority until a few years ago, 2) the ability to perform that mission at little or no increase in manpower to military force protection organizations, 3) the ability to reduce the vulnerability and casualties of the force protection personnel while performing this dangerous mission. The transition strategy is to roll CB2 capabilities into existing programs of record (POR) and acquisition program elements of Service force protection projects, and also to utilize the J34 sponsored Combating Terrorism Readiness Initiative fund. User data packages for each of the systems will be developed, along with a users' guide on how to select and introduce new technology for force protection. Four critical products from this ACTD have already been deployed to Iraq: 1) van-mounted backscatter x-ray for vehicle inspection, 2) vehicle under carriage video inspection systems, 3) infra-red imaging system, and 4) off-leash trained canines for explosives detection. Transition plans will include program of records for Anti Terrorism/Force Protection acquisition agencies in each of the 3 services, GSA, and the J34 Combating Terrorism Readiness Initiative Fund. Due to initiation of a newer JCTD called Joint Force Protection Advanced Security System (JFPASS) and efforts of Joint Improved Explosive Device Organization (JIEDDO), the CB2 ACTD will complete one year early in FY 2008 vice FY 2009.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Extended User Evaluation and transition activities continued for all Spirals and publish CB2 ACTD results. Completed ACTD early in FY 2008.				
Counter Intelligence - Human Intelligence Architecture Modernization Program, Intelligence Operations Now (CHAMPION) The Joint Requirements Oversight Council (JROC) validated the capability need for CHAMPION as a FY 2006 new start Joint Capability Technology Demonstration (JCTD). The outcome will provide improved capabilities for the counter-intelligence, human-intelligence and special forces communities of interest. These improvements will provide an accessible and actionable information system for management of the CI/HUMINT collection, mission planning and asset management information. The capabilities include technologies for integration of structured and un-structured reports, entity extraction and tagged geospatial information. The primary outputs demonstrated to the users and evaluated in the Military Utility Assessment are: 1) joint data standard for human domain; 2) CHAMPION information collection tool and associated concept of operations (CONOPS), tactics, techniques and procedures (TTPs); 3) CI-HUMINTmission management tools with federated search capability and data replication/access across multiple networks; and 4) integrated geo-tagged photo extraction, CIHUMINT data access tools for multi-intelligence discipline fusion. The efficiencies to be gained are; 1) improved effectiveness of HUMINT operations; 2) elimination of Human domain data stovepipes; 3) joint human domain data standard; 4) improved web enabled data access across multiple networks and security levels; 5) Joint CONOPs/ TTPs; 6) geo-spatially enabled mission and asset management tools, 7) prototype voice biometrics standards, architecture and operational concepts. The transition strategy is to incorporate CHAMPION capabilities into the Distributed Common Ground Station _Army program of record (POR) and PdM CHARCS. The sponsoring Combatant Command (CoCom) is the U. S. Central Command (CENTCOM). Other organizations involved as participants, users of capabilities, and/or observers include USSOCOM, USJFCOM, Defense Intelligence Agency, and the National Security Agency. The lead service is the Army. *FY 2008 Accomplishments:* Complete Spiral 2 assessment plan and prepare final assessment plan. Conduct final military utility assessment. Complete approval of transition plan. Interim capabilities fielded to unit in Afghanistan.	3.465	2.500	0.400	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
CHAMPION tactical communication package expedited fielding throughout CENTCOM area of operations. The CORVET Annex begins which is a voice biometrics enhancement to CI-HUMINT capabilities. CORVET is a technology used in speaker identification as another biometric modality to help counterintelligence and human intelligence forces contend in Overseas Contingency Operations (OCO). Speaker identification would join iris scan, fingerprints, and facial photographs as another means to verify and confirm identities. CORVET completed its Limited Utility Assessment at Camp Bullis. *FY 2009 Plans:* Finalize CONPs and TTPs. COCOM sponsor issue final assessment report. Continue to field interim capabilities into CENTCOM AOR. The JCTD completes in 2009. In FY 2009 the project is transitioning to Programs of Record. Corvett Annex development and integration. CORVET is completing technical demonstration #2 (TD) and the Military Utility Assessment (MUA). The MUA is being conducted at Camp Bullis in August 2009. *FY 2010 Plans:* Corvet Annex enhancement to CI-HUMIT will complete and transition to PM Biometrics.				
Critical Runway Assessment and Repair (CRATR) The Joint Requirements Oversight Council validated the capability need for CRATR as an FY 2008 new start. The outcome of CRATR is to develop the capability to conduct rapid airfield damage assessment, determine the minimum airfield operating surface required, identify unexploded ordnance, and repair runway damage to enable critical airfields to rapidly return to operation. The CRATR JCTD will evaluate existing, new and commercial technologies and procedures, and integrate the most successful of these technologies and procedures to develop both material and equipment solutions. The primary outputs and efficiencies to be demonstrated in the JCTD are: 1) Successful solutions from early demonstrations will be used to create an interim modular repair kit which will form the Spiral One capability for theater; 2) After a successful final demonstration, products from the CRATR QRF/JCTD will be packaged into a final modular repair kit that will transition to the USAF Airfield Damage Repair (ADR) program. CRATR is a 3-year project sponsored by US Pacific Command.. Lead service is the US Air Force. Air Combat Command is the Transition Manager.	2.600	4.100	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Conducted technology demonstrations to identify the best capabilities available for demonstration. Demonstrated and began operational assessment of crater filling and capping capabilities, as well as damage assessment techniques and platforms. *FY 2009 Plans:* Downselect demonstrated technologies and integrate into an operational capability is being demonstrated at Tyndall AFB and Yuma Proving Ground in April 2009. Coordinate and initiate the final demonstration of CRATR capabilities beginning in August 2009. Finalize CONOPS documentation. FY 2010 accomplishments are funded with "two year" FY 2009 funding and partnership funding. Complete live aircraft test in CONUS during final operational utility assessment. Complete final assessment report and send residuals with operational utility to forward based airfields. Conduct SDD and transition to ADR program. Complete JCTD in September 2010.				
Cross Domain Collaborative Information Environnent (CDCIE) The Joint Requirements Oversight Council (JROC) validated the capability need for CDCIE as an FY 2008 new start. The outcome of CDCIE is to demonstrate, in operationally relevant environments, the ability to share information across security domains. CDCIE provides a standards based, secure, scalable, collaborative information environment (CIE) to enable cost-effective coalition and interagency information sharing in both single and cross domain environments. The JCTD is a two-year project under sponsorship of JFCOM with STRATCOM as a cosponsor. CDCIE will transition to DISA Global Information Grid (GIG) Enterprise Services program office. DISA is the lead agency. The primary outputs and efficiencies to be demonstrated in the JCTD Operational Utility Assessment are (1) ability of the Joint Force Commander to communicate with all mission partners, including coalition, multinational and interagency partners, and (2) ability to share information with mission partners across different networks, classification levels and releasabilty boundaries.	3.471	2.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Completed integration of spiral 2 and demonstrated spiral 1 in Warfighter exercises and experiments. The first spiral demonstrated the ability to use a synchronous online chat program with language translation in a cross domain environment. Achieved initial authority to operate, and connected USSTRATCOM and UK MoD weblog functions in operational venues. *FY 2009 Plans:* Complete security testing of spiral 2 and operational utility analyses on the system. Spiral 2 will demonstrate the addition of collaborative white boarding and Web Services gateway functions in a cross domain environment. Operational prototype systems are being installed in CENTCOM and PACOM for real-world use. Transition manager is DISA. Transition Strategy in FY 2010 - Transition functionality to configuration management and sustainment by the DISA NCES program. Complete the JCTD.				
Distributed Network Switching (DNS) Joint Capability Demonstration Congress appropriated funds to integrate a maturing high-speed (40+ GBps) optical switching capability combined with a networking appliance that enables to masking of network media access control addresses. The outcome of DNS is to develop and demonstrate a stealth core backbone network for interoperable IP-based, high-capacity data transfer through secure networking functionality more immune to cyber-attack. The capabilities proposed for development in this capability demonstration will improve network defenses while enabling high-speed data transfer between authorized nodes. Navy will participate in developing and demonstrating the functionality. The primary outputs and efficiencies to be demonstrated are: 1) improved core networks capacity and redundancy, (2) improved cyber-attack immunity, and (3) users able to seamlessly use network services. DNS output is demonstrated stealth core functionality. The efficiency is that Warfighters will be able to interoperate in a over a new networking framework that provides increased immunity from cyber-attack. DNS may transition to Global Information Grid (GIG) core services. *FY 2008 Accomplishments:* Initial stealth core prototype.	1.600	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Event Management Framework (EMF)	3.000	3.600	0.000	
The Joint Requirements Oversight Council (JROC) validated the capability need for the EMF ACTD as a new start in FY 2006. The goal of EMF is to demonstrate the ground breaking capability of vertical and horizontal sharing of heretofore stove-piped information among organizations within and outside of DOD by emphasizing EMF policies; operational concepts; and tactics, techniques and procedures. In handling a terrorist event or incident, a horizontal information focus among Federal agencies is necessary during the interdiction phase of an incident. During response and recovery phases, a vertical information sharing focus among Federal, state, and local agencies is needed. A coherent interoperable information sharing mechanism is needed to: (1) Discover and share information resources throughout the incident based coalition domain; (2) Recognize the changing value of temporal information; and (3) Analyze and synchronize the large amounts of data relative to an event. All CoComs, as well as their non-DoD partners, have made large investments in command and control (C2) and collaboration coordination tools. But, to date, effective integration of those investments has been sub-optimal. The event management framework consists of policies, operational concepts and technologies to ensure decision makers can build a situational picture of an event with all relevant facts. The primary outputs and efficiencies to be demonstrated in the ACTD Military Utility Assessment (MUA) are: 1) Integrated EMF policies; operational concepts; and tactics, techniques and procedures; 2) Improved and more timely incident and information correlation to "connect the dots"; 3) Faster visualization of analytic results to aid decision makers in event assessment; 3) Addition of EMF databases and engine servers to cache data; 4) Capability to share information and analytical results across CoComs, Coalitions, Services, and its interagency partners; 5) Reduced time required for event based decision making. EMF is a three-year project under the sponsorship of the United States Northern Command. The lead agency is the Defense Information Systems Agency (DISA). *FY 2008 Accomplishments:* Spiral 1.1 and 1.2 completed. Completed two services: (EMF Semantic Correlation Service (EMF-SCS) and EMF Event Alerting Service (EMF-EAS).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Output Deliver Spiral 2.0 and 3.0.Conduct MUA. Working with NCES Program Office to support Federated Search with EMF Correlation Service. Use DISA's Federated Development and Certification Environment (FDCE) to institutionalize select services in NECC. The EMF ACTD is scheduled to complete in September 2009. FY 2010 Planned Transition Strategy - Residual Support of pilots for user assessment, and transition to NCES. Transition of components to the National Senior Level Decision Support System JCTD. FY 2011 Planned Output - Transition to NECC Increment TBD.				
Extended Space Sensors Arch (ESSA) The Joint Requirements Oversight Council (JROC) validated the capability need for ESSA as a FY 2006 new start. The ESSA ACTD is creating a joint, distributed, net-centric space surveillance framework. The expected outcome of the ESSA ACTD is a flexible, responsive and scalable command and control family of systems which enhance United States Strategic Command's (USSTRATCOM) Space Situational Awareness (SSA) capability. ESSA is a three-year ACTD sponsored by USSTRATCOM and Commander Joint Forces Component Command Space (CDR JFCC SPACE). The ESSA Operational Utility Assessment (OUA) is planned for mid FY 2009, and the capability will transition to Programs of Record (PORs) by the end of FY 2009. The lead service is the U.S. Air Force. The ESSA ACTD will develop and demonstrate a net-centric sensor architecture which provides more timely SSA information via the Secret Internet Protocol Router Network (SIPRNET) to decision makers. ESSA efficiencies will include: increased timeliness for delivering data products from sensor to command and control (C2) node; ability of netted sensors to perform more efficient strategies for searching, tracking, identifying and monitoring space object population; ability of C2 node to observe sensor operations in real-time and make rapid decisions in response to space events; and the ability of an architecture to support both theater and strategic users. While this ACTD does not answer all of the SSA gaps and shortfalls identified in USSTRATCOM's Space Control Joint Capability Document (JCD), it does address the number one priority identified in the JCD of synergistically exploiting all available SSA data. *FY 2008 Accomplishments:* Demonstration 2 was completed in May 2008. This demonstration included deep-space satellite monitoring, change detection and satellite conjunction analysis.	1.600	1.700	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: The ESSA ACTD is culminating in March/April 2009 with a final demonstration. This demonstration is centered on the characterization of a New Foreign Launch (NFL). The Ops IPT is leading the objective/ sub-objective development, as well as the DED and associated assessment methodology. The ESSA transition manager, with the help of the entire ESSA management team, is finalizing the transition plan for migrating ESSA ACTD capabilities into the hands of the warfighter. The transition plan will include two critical portions: the extended use of residuals and transition. The extended use of residuals, a two year period beginning April 2009, is increaseing the number of space surveillance network (SSN) sensors connected in a net-centric service orientated architecture and defining an operationally focused concept of operations and tactics, techniques, and procedures. The transition period begins after the extended use of residuals period has ended. During the transition period, additional SSN sensors are being added to the net-centric C2 network; however, detailed oversight and procedural development support are the responsibility of the warfighter. The ACTD will complete in FY 2009.				
FLM Small Diameter Bomb The Joint Requirements Oversight Council (JROC) validated the capability need for FLM as a new start in FY 2006. The outcome of FLM is to provide the Combat Air Force the ability to prosecute high-value targets in collateral damage sensitive environments. FLM integrates a carbon fiber warhead case and the multi-phase blast explosive (MBX) onto the existing Small Diameter Bomb (SDB) I airframe. The FLM is not intended to replace SDB I but to complement it. FLM's sub-four meter accuracy will result in pin-point focused lethality with minimal collateral damage effects. FLM is a four-year project under sponsorship of United States Central Command (USCENTCOM) and with the U.S. Air Force as Lead Service/Agency. Completion of system development, demonstration, and fielding (approximately 50 residual FLM weapons) occurs by mid-CY 2008 with continued contractor provided system field support through mid-CY 2010. The primary outputs and efficiencies to be demonstrated in the JCTD Military Utility Assessment are (1) successful integration of the carbon fiber warhead and MBX onto the existing SDB I airframe with a fully functioning weapon and kill mechanism, (2) safe carriage and separation from F-15E, (3) to demonstrate FLM's sub-four meter accuracy, (4) the elimination of fragmentation as kill mechanisms in the FLM weapon	6.200	2.200	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
integration design,(5) a full and complete characterization of FLM's capability against defined a target set for USCENTCOM. The planned transition strategy is: (1) Upon successful Military Utility demonstration, USCENTCOM will conduct Extended User Evaluation (EUE) of the residual FLM weapons; (2) Upon receipt of formal direction and funding, the SDB program office will transition FLM into the formal acquisition cycle at Milestone C acquiring Low Rate Initial Production (LRIP) quantities; (3) The SDB program office will conduct follow-on system development and demonstration, production, and fielding support *FY 2008 Accomplishments:* Final operational demonstration of FLM. Delivered approximately 50 residual FLMs to CENTCOM. Initiated 2-years of operational logistical field support. Begin FLM insensitive munition and hazard classification certification. Initiated preparation for formal acquisition program transition. Transition manager was 918th Armament Systems Group. *FY 2009 Plans:* Continue FLM residual weapon fielding support. Complete FLM insensitive munition and hazard classification certification. Complete Milestone C transition activities which include final system maturation and assessment. The FLM JCTD scheduled completion is January 2010.				
Common Ground The Joint Requirements Oversight Council (JROC) validated the need for Common Ground functionality for a FY 2009 new start. The Common Ground JCTD seeks to provide the analytic and architectural components necessary to achieve common, inter-Service, Joint and NATO/Coalition ground forces interoperability with respect to actionable geospatial data and information. Common Ground is built upon existing DoD net-centric data and Service Oriented Architecture (SOA) standards and guidance as well as international standards adopted by the US addressing information modeling and exchange (JC3IEDM). This results in the capability to unify Command and Control and Simulation systems to provide the ability to perform course of action development, assessment and rehearsal over correct terrain products such that planners and executors can be proactive and prepared for the unexpected by concentrating on	0.000	6.100	5.375	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
identifying the information needed, the paths and timing of force movements, and a more refined estimate of resources needed for successful operations. The expected outcome is to have Joint or Coalition capability to interoperate on common, actionable geospatial and C2 data and information and to have shared awareness to achieve unity of adaptive planning, execution and effects among C2 enclaves. The expected Service, Joint and Coalition operational capabilities and efficiencies provided by Common Ground are: 1) a user-definable Common Operating Picture (COP) supporting predictive analysis; 2) analytics for force on force wargaming, COA analysis and mission rehearsal; 3) analytic C2 services for ground and UAS platform operational management, sensor effects; leading to 4) a 3x reduction in the time from Mission definition to execution and a 4x acceleration in the execution response to dynamic Operating Environment conditions and objectives (i.e. Fragmentary Orders). From an information superiority standpoint, Common Ground will enable: 1) the sharing of digital orders and plans across C2 and Simulation systems, a reduction of errors and misunderstanding by 5x in distributed collaboration. The last are of value to the operational force is that of the unit cost and sustainability of C2 and geospatial interoperability to the DoD. All Common Ground capabilities described will be incorporated as commercial software under a DoD Enterprise License currently available to over 200 Joint and Service Programs of Record (POR) through 2014. Common Ground plans for a final demonstration and assessment in the fourth quarter of FY 2010 and transition to the CJMTK, NECC and Army / USMC geospatial and C2 systems in the US and NATO's Core Geographic Services Enterprise and Land C2 Information System program of records in FY 2011. Common Ground is a three year JCTD sponsored by USJFCOM. The US Army ERDC is the lead agency. *FY 2009 Plans:* Verify unified doctrine for US and NATO ground operations C2, missions and tasks. Establish a prototype of a geospatially extended JC3IEDM supporting US-NATO interoperability. Implementation of common US analytic services in US ground C2 Systems. Conduct functional technology demonstrations to ensure architectural and IT stability and interim user juries to facilitate a user centric design for the components and information products within mission thread / use case assessment scenarios.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2010 Plans: Continue evolution of unified doctrine enhancements needed for US /NATO and a Coalition Nation ground operations C2, missions and tasks. Demonstrate commercial geospatially extended JC3IEDM supporting Joint and multinational interoperability. Demonstrate common NATO and US analytic services in Joint C2 Systems. Draft JC3IEDM specification extension to US and international JC3IEDM standards body. Produce test reports on architectural stability and interim user juries to facilitate a user centric design for the components and information products. Perform initial operational user assessment between US and NATO to validate assumptions on C2 efficiencies, model architectures and baseline interoperability, network and architecture metrics. Award DoD Enterprise contract for all analytic and interoperability software. Initiate DTMOLPF activities.				
FY 2010 JCTD Rolling Starts *FY 2010 Plans:* In FY 2010 JCTD selection process there will be three to five JCTDs identified by the Department as potential rolling starts. These projects will be selected because they represent important warfighter concerns and capabilities. Some of these compelling proposals will address issues with emerging technologies that could be significant game changers. While these projects will be successfully vetted through the JCTD selection process, some additional proposal development must be addressed with the stakeholders (i.e., Services, Agencies, Coalition and Inter-agency partners), prior to project initiation. In FY 2009 there are several candidates that are particularly compelling; however, due to technology or resource related issues, they are still in a developmental stage. These projects show such great potential capability that they will be included as part of the official congressional notification requirement anticipating initiation as they become ready. This helps meet the new JCTD goal of being a more agile process to meet urgent warfighter needs faster.	0.000	0.000	22.387	
FY 2010 JCTD New Starts *FY 2010 Plans:* Funding for FY 2010 JCTD new starts that will result from the JCTD selection process that will begin in March 2009. New start selections will be finalized in August/September of 2009, just prior to the year	0.000	0.000	54.855	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
of execution. These funds will start six to ten new starts in FY 2010. Although the specific projects are unknown at this time, the 2010 selection process provides a more rapid delivery of capabilities than the traditional, incremental programming and budgeting methods that are supported by the deliberative Planning, Programming, Budgeting and Execution (PPBE) process. The JCTD process is adaptive and provides an agile technology development and demonstration program to better address a quickly changing threat. The JCTD model is an agile process spanning of two to four years. The concept falls between the Joint Rapid Action Cell (JRAC) urgent needs process of less than two years with little or no development, and the traditional, more deliberate, formal acquisition process that can stretch five to ten years. Final selection of projects just prior to the fiscal year allows for the program to be as agile as possible.				
FY 2011 JCTD New Starts	0.000	0.000	0.000	
Funding for FY 2011 JCTD new starts that will result from the JCTD selection process that will begin in March 2010. New start selections will be finalized in August/September of 2010, just prior to the year of execution. These funds will start six to ten new starts in FY 2010. Although the specific projects are unknown at this time, the 2011 selection process provides a more rapid delivery of capabilities than the traditional, incremental programming and budgeting methods that are supported by the deliberative Planning, Programming, Budgeting and Execution (PPBE) process. The JCTD process is adaptive and provides an agile technology development and demonstration program to better address a quickly changing threat. The JCTD model is an agile process spanning of two to four years. The concept falls between the Joint Rapid Action Cell (JRAC) urgent needs process of less than two years with little or no development, and the traditional, more deliberate, formal acquisition process that can stretch five to ten years. Final selection of projects just prior to the fiscal year allows for the program to be as agile as possible.				
Global Observer (GO)	7.348	8.100	2.800	
The Joint Requirements Oversight Council (JROC) validated the capability need for Global Observer as an FY 2007 new start. The Global Observer JCTD is a transformational technology program that proposes to demonstrate a liquid hydrogen powered unmanned aerial vehicle, using a modified, off-the-shelf internal combustion engine, capable of flying extremely long endurance (objective of 7 days on station) with a				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
moderately sized payload capacity (380 lbs) at an altitude of 55-65,000 ft. mean sea level. The output of Global Observer will be to provide low-cost persistent surveillance (ISR). The efficiencies of Global Observe will be a long endurance capability that would support placing system into theater from garrisoned locations, reducing the number of forward bases required for world-wide operations and relieving the optempo from other overstressed assets. *FY 2008 Accomplishments:* Designed, developed, fabricated, integrated, and tested of 1 GO UAS, to include 1 air vehicle and 1 launch and recovery element (LRE). The final demonstration and JCTD completion will be in FY 2010. *FY 2009 Plans:* Supporting the manufacture, integration, and test of Aircraft #1 and Aircraft #2; Aircraft #1 complete & ready for integrated system testing, 3Q FY 2009; the manufacture, integration, and test of LRE #1 & LRE #2 - LRE #1 complete and ready for integrated system testing, 3Q FY 2009; LRE #2 complete and ready for integrated system testing, 44 FY 2009; System flight test events at the flight test range; Flight test venue preparation, range safety reviews, test planning 2 – 3Q FY 2009; System deployed to flight test venue, 4Q FY 2009; Flight test range operations and T&E support and Operational Test Agency. *FY 2010 Plans:* Aircraft #2 complete & ready for integrated system testing, 1Q FY 2010; Flight Readiness Review, 1Q FY 2010. Transition Strategy: The residual package will be transitioned to Air Force Special Operations Command for extended use to support its core mission of intelligence, surveillance, and reconnaissance with the persistent operations using the Eectro-Optics/Infrared and communications relay payloads. Pending Joint Requirements Oversight Council validation of the capability requirement, the Air Force Air Combat Command will transition Global Observer to the Combined Air Force.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Hard Target Void Sensing (HTVS) Fuse	6.000	6.100	6.200	

The Joint Requirements Oversight Council (JROC) validated the capability need for HTVS Fuze as a FY 2008 new start. The HTVS Fuze JCTD incorporates two significant features: (1) Capability to count voids and detonate at the optimal point, (2) Capability to survive and function in today's harder target environments. The HTVS fuze business model provides a fuze approach that is applicable to the BLU-109, BLU-113 and BLU-122 legacy warheads. The JCTD will provide warfighting commands a proven capability with a number of residual mission ready fuzes no later than 12 months after the JCTD. The acquisition strategy allows a smooth transition from the JCTD to Systems Development and Demonstration (SDD) in FY 2010 followed by production. The U.S. Navy also has a requirement for this capability and has agreed to fund part of the JCTD in FY 2009. To date, the HTVS Fuze JCTD has accomplished the following: Management transferred from AAC/XRS to 708 ARSG; Sufficiency review for FY09 APOM initiative to fund JCTD complete; Sufficiency review for SDD, Production and Sustainment completed; Acquisition Strategy for entire HTVSF Program Approved; Contract Award to two contractors; Systems Requirements Review and Systems Functional Review for both contractors.

FY 2008 Accomplishments:
Implementation Directive approved. Contract awarded for two contracts in March (08) for a 27 month rolling down-select to one contractor for SDD and Production. Systems Requirements Review and Systems Functional Review for both contractors completed. The focus was initially on Modeling and Simulations (M&S) in the appropriate target environments for the BLU-109 and BLU-113 warheads. The contractors refined void sensing modules to ensure effective operation.

FY 2009 Plans:
Management and Transition Plan is being approved. Preliminary Design Review (PDR) and Interim Design Review (IDR) will be completed. Initial sub-scale testing (cannon testing) and sled testing will be conducted in an effort to refine M&S models. Initial Flight Testing will also begin.

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Sled and Flight testing completed. Critical Design Review completed. As the down-select to one contractor approaches the contractors will be required to meet the governments' exit criteria for the HTVSF JCTD. The fuze must (1) survive and function during a fuze demo while penetrating 10K+PSI targets, (2) demonstrate successful capability for detecting and counting more than one void during target penetration (3) demonstrate time-delay capabilities, (4) demonstrate cockpit programmability (5) Demonstrate trend toward affordability goal. In the 3Q. FY 2010 will award a 33 month SDD and production contract for 5000 units. Complete the JCTD.				
Hardware Encryption Tech Program Congress appropriated funds to counter the recurring issue of lost computers and resultant compromise of sensitive but unclassified information (such as social security numbers, personal identifying data, or agency information) by maturing foreign developed intellectual property and open source code encryption algorithms (Advanced Encryption Standard - AES) hardware-based hard disk encryption technology. The outcome of the Hardware Encryption Tech Program is data-at-rest encryption in mobile computing devices. The Hardware Encryption Tech Program output is certified commercially available hardware products for data-at-rest protection of sensitive but unclassified information in mobile environments, including but not limited to Defense applications. Navy was the lead Service in productizing the intellectual property, working through the formal United States National Institute of Standards and Technology (NIST) and National Security Agency (NSA) encryption product certification processes, and demonstrating hard disk encryption functionality. The efficiency demonstrated is protection of data-at-rest in commercially available and certified mobile computing devices and reduced risk of loss of sensitive information. The Hardware Encryption Tech Program will transition to a commercially available product line for use by any executive department agency requiring protection of data at rest. *FY 2008 Accomplishments:* Productization of the FIPS 140-2 and Common Criteria/Evaluation Assurance Level Four plus (EAL 4+) certified components and transition to commercial production.	1.600	0.000	0.000	
Internet Protocol Router in Space (IRIS)	5.500	5.200	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Joint Requirements Oversight Council (JROC) validated the need for capability from IRIS as a FY 2007 new start. IRIS leverages a planned launch of a commercial communications satellite to introduce Internet Protocol (IP) routing and cross-banding between C-band and Ku-band transponders. USSTRATCOM is assigned responsibility for global network operations, and as the operational user sponsor seeks to improve network reliability and endurability through dynamic topology updates (multiple transport paths) and improved collaboration and interoperability among info sources and users (e.g., sensors, soldiers, command centers at Joint, Allied and Coalition levels). The IRIS outputs and efficiencies include (1) demonstrate the capability to collaborate with industry in leveraging the commercial acquisition processes to provide near-term, space-based, IP routing network capability, (2) demonstrate the capability via a commercial payload to conduct on-board IP packet routing communications from a geostationary orbit, (3) explore and incorporate a decision process to determine military user assignment to commercially provided IRIS SATCOM capability. The Defense Information System Agency (DISA) is the lead Service and will develop a provisioning model for future assignment of military users to the demonstrated commercial capability as appropriate; and define contracting language for future services subscription in support of operations, including integration of IRIS services into existing network architectures beyond the IRIS JCTD.				
FY 2008 Accomplishments: Validated and verified draft CONOPS and demonstration architectures to enable a limited military utility assessment of an emulated IRIS capability. Participated in the industry led end-to-end IRIS technical capabilities demonstration with representative hardware prior to Intelsat General IS-14 launch. Conducted high bandwidth video teleconference demonstration of counter-drug interdiction operations with underway USCG cutter as first operational application of IRIS functionality.				
FY 2009 Plans: Industry launches IS-14 spacecraft in CY2009. Conduct a live scenario and capability based demonstrations culminating in a final military utility assessment of the IRIS JCTD. The IRIS JCTD is leaving behind knowledge of the functionality and application of the commercially provided IRIS capability on a fee for service basis to provide a space based routing enterprise solution that enables video, voice and data network services. Complete the JCTD. Long range transition is dependent on industry ability				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
to deliver functionality usable by military users, and contracting language and processes to provision the network services. Introduce the functionality to international partners through USAFRICOM sponsored capacity building demonstrations.				
Joint Coordinated Real-time Engagement (JCRE)	1.200	1.000	0.000	
The Joint Requirements Oversight Council (JROC) validated the capability need for JCRE as an FY 2005 start. The outcome of JCRE will be to develop the CONOPS and the GIG-enabled software that enables Joint Real-Time Operations and Engagement across multi-Combatant Command (COCOM) Theaters and Echelons. JCRE will support Joint Operations by providing Net-Centric Command and Control Tools that greatly enhance Planning and Execution across multiple COCOMS. These tools will be provided as web services, so they can easily be extended to support Combined Operations as directed by the Operational Sponsor. The JCRE capability will be achieved by extending and integrating the following technologies: Joint Force Global Situational Awareness (SA) Tools; Joint Force Engagement Packages; and Joint Force Synchronization Tools. These JCRE technology components will be implemented using a Service Oriented Architecture (SOA) with distributed service orchestration. These JCRE technologies, tested on the Global Information Grid (GIG), will help validate whether the evolving GIG IP architecture and enterprise services can support the time sensitive performance requirements for global operations. Output and Efficiencies: percentage of relevant data that is properly synchronized; percentage of global operation centers that have Synchronization awareness; percentage of synchronization problems that go undetected for more than 10 minutes; Average time to detect a synchronization problem; Average time to determine impact of synchronization problems on effects; time to assemble and organize global effects; workload to assemble and organize global effects; time to synchronize global actions, capabilities, and resources; workload to synchronize global actions, capabilities, and resources; number of resynchronizations / number of original synchronizations (synchronization robustness); time to create a globally synchronized operational plan. The lead service is the Navy and the lead CoComs are U.S. Strategic Command and U.S. Special Operations Commands.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Demonstration #3 (Fall 2007). Demonstrated Joint Force Global Situational Awareness Tools, Joint Force Engagement Packages, and Joint Force Synchronization Tools in a battle staff exercise. A Joint MUA was performed in conjunction with the final demonstration. *FY 2009 Plans:* Prepare JCRE capability for primary transition to Net Enabled Command Capability (NECC). The EUE Package consists of the JCRE System Prototype (all hardware and software required to host JCRE capabilities, in full or presentation server configuration), is being installed at USSTRATCOM, USSOCOM and DISA as necessary, and finalized CONOPS and TTP documents and training packages, to be delivered to US Joint Forces Command (USJFCOM). Secondary transition targets include USSTRATCOM and USSOCOM programs of record-Integrated Strategic Planning & Analysis Network (ISPAN) and Special Operations Mission Planning Environment (SOMPE), respectively. Navy PEO C4I and Space are transitioning relevant capabilities as web services into GCCS-M/NECC. The ACTD completes in FY2009.				
Joint Enable Theater Access (JETA-SPOD) The Joint Requirements Oversight Council (JROC) validated the need for JETA-SPOD capabilities as a FY 2006 new start. The outcome of JETA-SPOD is to develop and demonstrate: a Lightweight Modular Causeway System (LMCS) transportable by and employable from intra-theater sealift vessels such as the JHSV or other current Army/Navy watercraft; and an austere port Decision Support Tool for selection of optimal sites from multiple austere SPOD options. The capabilities proposed for development in this ACTD will optimize the use of the Joint High Speed Vessel (JHSV), current Army/Naval watercraft, and Lines of Communication (LOC) bridging requirements by providing increased and more rapid flow of combat power and sustainment through multiple theater austere seaport locations. This provides to Joint/ Combined Force (J/CFC) commanders a means to mitigate threat anti-access activities and increases flexibility to conduct operational maneuver from strategic distances. JETA-SPOD ACTD is a three-year project under sponsorship of U.S. Pacific Command, with completion of development and demonstration by end of FY2008; and transition to U.S. logistics systems as early as FY2009. The lead service is Army. The primary outputs and efficiencies to be demonstrated in the ACTD Military Utility Assessment	3.500	0.600	0.500	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
(MUA) are: 1) the LMCS will reduce weight, volume, and deployment time compared to existing military causeway and bridging systems; 2) the operational parameters for evaluating the military utility of the LMCS are based on a quantitative and qualitative comparison to the capability provided by the existing Modular Causeway System (MCS); 3) LMCS will result in a reduction in weight and volume by 50 percent over the MCS; a reduction in deployment time by 50 percent over the MCS; and elimination of in-water connections; 4) the Decision Support Tool capability equates to an increase in availability of throughput prediction information for 50-80 percent of worldwide small ports; and 5) the combination of LMCS and the Decision Support Tool includes a five-fold increase in the number of JHSV-compatible ports and doubling of the port throughput rate. LMCS Output includes incorporation of state-of-the-art connector and tensioning technology; innovative emplacement and recovery system applicable to multiple military/ civilian platforms; innovative self-locking and strap tensioning technologies; high strength fabrics for robust, lightweight floatation technology that quickly inflates/deflates for rapid LMCS emplacement and recovery; puncture/abrasion resistant floatation components; lightweight decking materials; and common 8x20 rapid transport footprint design. The efficiency is that the transport (land/sea) cost of moving causeway capabilities into austere SPODs will be significantly reduced; and causeway capabilities will arrive in theater more rapidly with a smaller logistics footprint. Austere Port Decision Support Tool Output includes query-able austere world port data; a port characterization model; rapid port enhancement tool; austere port throughput simulation; a comprehensive set of environmental and physical factors affecting ingress/ egress throughput rates; and parametric algorithms for throughput rates in small ports and rates for planning and execution of vessel offload operations; developed with an open source tool; user friendly Graphical User Interfaces (GUI); and runs on a laptop computer. The efficiency is that the warfighter will possess flexibility and a broader range of options to establish austere seaports as strategic or operational maneuver entry points with a greater assurance of success. The transition strategy for LMCS and the Decision Support Tool is to establish Programs of Record under the guidance of two Transition Managers: Product Director, Army Watercraft Systems (PD AWS) and USTRANSCOM, respectively. *FY 2008 Accomplishments:* Developed final LMCS and Decision Support Tool CONOPS; finalized extended user evaluation and Interim Transition Planning; conducted LMCS full-scale functional system demonstrations and CONUS				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
LMCS testing; completed system integration and incorporated lessons learned; completed LMCS fabrication; conducted Decision Support Tool Limited User Evaluations (LUE); delivered final version of Decision Support Tool; completed Training Plan; conducted user training in preparation for MUA; completed MUA/Final Demonstration in September 2008. *FY 2009 Plans:* Develop final MUA and ACTD report; plan transition of Decision Support Tool and LMCS to Programs of Record NLT FY 2009 and FY12, respectively. Deliver pre-transition and interim capability/residuals to the user (includes LMCS system and Decision Support Tool with Final Data Set); plan the use of LMCS and Decision Support Tool in exercises for continued refinement and continued socialization for transition. *FY 2010 Plans:* JETA-SPOD ACTD scheduled completion date is September 2010. These activities in FY 2010 will be funded with resources from JCTD partnerships with the services and agencies sponsoring the project.				
Joint Force Protection Advanced Security System (JFPASS) The Joint Requirements Oversight Council validated the capability need for JFPASS as an FY 2008 new start. JFPASS addresses the validated problem that current force protection technologies and concepts of operation do not provide a comprehensive, effective, and sustainable Joint force protection capability. Fielded systems do not provide comprehensive situation awareness, absorb too much manpower, and are too costly with many variants and redundancies. The outcome of JFPASS is to demonstrate and transition an integrated joint force protection Command and Control architecture, providing rapid situation awareness where needed, decision support, and more effective force protection with reduced workload through systems integration. The primary outputs and efficiencies to be demonstrated in the JCTD are: 1) numbers of currently distinct force protection systems that are integrated for common situation awareness; 2) decreased time required to provide situation awareness to all in chain of command with force protection response missions; 3) decrease in operations center manning and workload required to maintain force protection situation awareness and manage situation responses. JFPASS is a 3-year project sponsored by US European Command. The project will conduct an initial demonstration and limited assessment after one year, to be followed by in-theater installations and operational utility assessment in the second	4.800	4.800	4.800	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
year. Army, Navy, and Air Force force protection experts are participating and contributing funding and expertise to the demonstration of this Joint force protection capability. The US Navy is providing the Technical Manager, US Air Force provides the deputy Technical Manager, and US Army provides the Transition Manager. This project is aligned with the Joint Staff Installation Unit Base Integrated Protection Capabilities Based Assessment process. *FY 2008 Accomplishments:* Completed participation in Joint experiments to assess situation awareness and systems integration concepts for access control, vehicle inspection, intrusion detection, unmanned sensor, waterside security, and CBRN systems. Completed project Implementation Directive and draft Management Plan. Completed equipment selection for in-theater Operational Demonstration 2. Conducted technical demonstration 1, and planning and concepts of operation for Operational Demonstration 1. *FY 2009 Plans:* Refine situation awareness and systems integration architecture. Complete Operational Demonstration 1 and limited utility assessment at CONUS facility. Install integrated capability at high priority EUCOM-selected base. Conduct Operational Demonstration 2. Continue transition planning. *FY 2010 Plans:* Complete utility assessment. Complete JCTD. See JCTD BA4 R2a for additional transition activity.				
Joint Multi-Mission Electro-Optic Sys. (JMMES) The Joint Requirements Oversight Council validated the capability need for JMMES as an FY 2007 new start. The outcome of JMMES is demonstration and transition of airborne sensors and automated processing for automatic detection of items of interest for Joint Service, Coalition, and Interagency partners. The JMMES project will demonstrate use of advanced multi-spectral sensors in an aircraft turret compatible with existing turret mounts in US Navy, US Army, Drug Enforcement Agency, and British and Canadian aircraft, as well as future planned unmanned air systems. The project will develop and demonstrate automatic processing and automated operator cueing for targets such as submarines, mines, targets under trees, illicit crops, and search-and-rescue targets at sea. The primary outputs	2.950	4.600	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and efficiencies to be demonstrated in JMMES Military Utility Assessments are (1) ability of JMMES to recognize targets of interest, in terms of (a) percent of auto detections and auto cues that are relevant, (b) distance error of auto detect and auto cue reports, (c) timeliness of reports (seconds) to decision makers; and (2) ability of JMMES to defeat denial and deception efforts, in terms of (a) percent of denial and deception efforts defeated, (b) where and when JMMES applies (operating environments, seasons, time of day, range, etc.), (c) percent of time operable during missions, and (d) reliability and logistic support requirements. JMMES is a 3-year project sponsored by U.S. Pacific Command and U.S. Southern Command. Initial capabilities will be demonstrated and operated in FY 2007, with demonstrations against additional targets with additional aircraft types in FY 2008 and FY 2009. Transition activities began in FY 2007, leading to firm transition to programs of record, with proposed BA-4 funding bridge if the Navy transition Program of Record slips to FY 2012. The lead Service is U.S. Navy. *FY 2008 Accomplishments:* Flight tested second generation JMMES system, collected data for algorithm development. Continued algorithm testing for mine detection, search and rescue, counter concealment and deception, and illicit crop detection. Completed Project Agreement with Canada, enabling Canadian participation in additional algorithm development and testing aboard Canadian aircraft. Integrated sensors for third generation JMMES system. Informed that targeted Navy Program of Record for transition will slip to FY 2012, therefore planned transition funding and sustainment/integration activities to bridge the FY 2010-FY2011 gap. *FY 2009 Plans:* Completing flight testing and conducting military utility assessment. Supports ongoing transition and preparation for FY 2010 sustainment/integration activities (bridge to program of record). Completing Concept of Operations, Tactics/Techniques/Procedures, and System Architecture documentation. Completing military utility assessment. Completing the JCTD.				
Joint Precision Air Drop System (JPADS) The Joint Requirements Oversight Council (JROC) validated the capability need for JPADS as an FY 2004 new start. The outcome of JPADS is to demonstrate a fast, flexible, direct projection-based distribution	2.500	0.000	0.000	

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system to sustain rapidly deployed forces at any global destination - strategically, operationally, and tactically. The primary output and efficiencies are to demonstrate a high-altitude (25,000 ft. Mean Sea Level (MSL)) autonomous offset airdrop capability (goal 8-25 miles offset) with the option to deliver separate and distinct payloads (up to 10,000 lb total, full rigged weight, minimum of 8.5Klbs of usable payload) to multiple locations from one release point to within a 250 meter (threshold) Circular Error Probable (CEP) (50 meter CEP objective). This effort focuses Army and Air Force programs and initiatives on meeting joint airdrop requirements. JPADS will provide a seamless and flexible system of systems approach, providing materiel resupply capabilities to meet dynamic in theater operational requirements and the strategic requirement of the CoComs worldwide no later than 24 hours from the request. JPADS is a four-year project with completion of the Advanced Concept Technology Demonstration (ACTD) development and demonstration by end of FY 2008 transitioning to United States Army (USA) Program Manager Force Sustainment Systems (PM FSS), U.S. Air Force (USAF) Mobility Systems Wing systems (Mission Planner (MP) hardware) and the USAF Electronic Systems Command (MP Software) by FY 2008. Transition accomplished to date: USAF Mission planner to both Afghanistan and Iraq, ongoing integration of MP into the Marine Corps C130J and into USSOCOM/USMC navigational aid for Military Free Fall (MFF) systems.				
FY 2008 Accomplishments: Transitioned residual systems to USSOCOM (USASOC) units in requesting the residual systems by an approved ONS/MNS. Continued to execute interim transition with users in conjunction with PORs to include training and numerous weeks of airdrops with remaining systems available. Executed the first of three planned extended user evaluation (EUE) during DoD and NATO sponsored Precision Airdrop Technology Conference and Demonstration (PATCAD) October 2007 and Precision Airdrop Capability Demonstration May 2008. Extended user training completed in September 2008.				
FY 2009 Transition Strategy - The ACTD is transitioning high-altitude, aircraft deployable, autonomous, airdrop systems, and in-flight mission planning with wireless communication to guidance, navigation, and control systems to the Army Product Manager, Force Sustainment Systems and Air Mobility Command's Combat Operations.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Joint Surface Warfare (JSuW)	5.500	5.800	1.200	
The Joint Requirements Oversight Council (JROC) validated the capability need for JSuW as an FY 2007 new start. The output of the JSuW JCTD will be to allow multiple existing Intelligence, Surveillance, and Reconnaissance (ISR) assets, launch platforms, and standoff weapons to communicate via maturing weapons data link network technologies. The efficiency will be that Joint ISR platforms may provide initial targeting data and in-flight targeting updates to standoff weapons while the launch platform either remains beyond or decreases time inside the threat envelope. As a result of this interaction via the weapons data link network, the Combatant Commander will be provided multiple options for joint kill chains to increase operational agility, and have significantly extended space in which surface targets may be successfully prosecuted. *FY 2008 Accomplishments:* Deliverables included documented Concept(s) of Operation (CONOPS), Tactics, Techniques, and Procedures (TTP), and software changes to operational flight programs aboard demonstration ISR platforms. Transition Strategy: Following the demonstration, validated software has readily available to incorporate into additional assets via each individual acquisition program's mode of software push. CONOPS and TTP were disseminated to the Services through their respective training commands to capitalize on enhanced capabilities. All platforms and weapons involved are Programs of Record. *FY 2009 Plans:* System testing and flight demonstration. *FY 2010 Plans:* Final demonstration and JCTD completion.				
Large Data	9.100	9.000	0.000	
The Joint Requirements Oversight Council (JROC) validated the capability need for Large Data as an FY 2006 new start JCTD. The outcome of Large Data demonstrated the military utility of a highly scalable, rapid, and secure integrated capability to retrieve, store and share massive amounts of information				

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effectively between globally distributed users. It provides increased situational awareness by displaying large, fused sets of geospatially-referenced data in a Joint Warfighting context using intuitive user dataset navigation techniques. The primary outputs and efficiencies demonstrated in the JCTD Military Utility Assessment are: 1) Synchronization of databases across all major operational storage nodes, i.e. cache coherency; 2) Timely delivery and sharing of data - instant real time access and collaboration; 3) Intuitive ways for users to navigate large (petabytes to exabytes) data sets; 4) Ability to easily visualize huge amounts of data generated; 5) Capability to perform "trackback" or change analysis on an unprecedented scale. The sponsor was U. S. Strategic Command. The lead agencies were the National Geospatial Agency (NGA) and Defense Systems Agency (DISA). Transition in FY 2009 to National Geospatial Agency (NGA) and Defense Systems Agency (DISA). The Large Data JCTD completed in December 2008. *FY 2008 Accomplishments:* Provided capability to the edge -- from CoComs to low bandwidth users. Refined software with advanced geospatial and temporal search capabilities. Added a Zoomable User interface. Initiated JWICS accreditation. Added metadata tagging enhancements. Provided large data capacity to xESSA, JCRE ACTD and other net-centric capabilities. Conducted JMUA. *FY 2009 Plans:* Finalize JMUA reporting. Continue use of functionality in preparation for integration and transition into program of record. Complete the JCTD.				
Louisiana Command and Control Interope Communications and Information An operational model for high speed reliable wireless communications in Louisiana that is standards-based and is accessible to the Department of Defense when required during military support operations. The venue was selected in part due to the convergence of elements of the national critical infrastructure and defense industrial base. By adhering to open networking standards the functional advantage of this high capacity digital network is to provide new and innovative ways to fuse sensor and C2 functions which advances the daily operations of the practitioners and has scalability in times of crisis regardless of origin, man-made or natural disaster. Operating with a hybrid 5.8 GHz and 4.9 GHz implementation, the project provides the advantage of using uncluttered public safety radio licenses for reliable communications and	2.000	0.000	0.000	

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higher performance equipment to support non-public safety participants and backup communications pathways. Congressional funding was provided in 2006 to finish the build-out and testing of the network. *FY 2008 Accomplishments:* Congressional funding has expanded those Command and Control capabilities in Louisiana.				
MASINT Tactical Intelligence Fusion (MASTIF)	3.700	2.500	2.696	
The Joint Requirements Oversight Council (JROC) validated the capability need for MASCOT, renamed MASTIF, as an FY 2006 new start. The outcome of MASTIF is to provide the warfighter with a data fusion capability to enable a single operator to exploit the benefits of a suite of multidisciplined sensors against concealed/obscured targets in near real-time while: (1) Enabling a single operator with minimum time over target to rapidly detect, identify, and geolocate potential targets using automated sensor fusion and reasoning; (2) Reducing sensor false alarm rates by combining multiple types of intelligence sensor outputs ; (3) Increasing operator efficiency by improving situational awareness through automated sensor management and pointing; (4) Eliminating the need for the operator to gain expertise on each individual sensor; and (5) Providing an open architecture design that can be adapted and tailored to different mission applications and operational environments. This five-year project is under the sponsorship of the United States Southern Command (USSOUTHCOM), which also serves as the Operational Manager. The lead DOD agency is the Defense Intelligence Agency (DIA) and the Transition Manager is the United States Special Operations Command (USSOCOM). *FY 2008 Accomplishments:* Matured fusion capability. Completed final test configuration of data fusion engine software and conducted Demo 1 with sensor integration and ground test on-board aircraft. Began flight testing and test-fix-test iteration for developmental testing phase. *FY 2009 Plans:* Perform final stages of sensor integration and complete developmental testing; carry out operational testing activities; and conduct final demonstration on airborne test platform for JMUA. Coordinate with transition partners for custom capabilities to field during transition and identify opportunities for integration				

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of other on- or off-board sensor information. Support modifications to and provide documentation required for transition. *FY 2010 Plans:* Conduct OCONUS testing in relevant SOUTHCOM environment to examine military utility further, as well as partnering with additional programs and collection capabilities to examine synergies in data and CONOPs. Customize system for installation on user partner platform. Continue development of CONOPs and TTPs, based on user feedback.				
Mapping the Human Terrain (MAP-HT) The Joint Requirements Oversight Council (JROC) validated the capability need for MAP-HT as a FY 2007 new start Joint Capability Technology Demonstration. The outcome will provide improved capabilities to effectively collect, consolidate, visualize and understand open source socio-cultural (green data) information to assist Commanders understanding of the human terrain in their Area of Responsibility (AOR). MAP-HT JCTD will develop and demonstrate an integrated, open-source, spatially/relationally/ temporally referenced human terrain data collection and visualization toolkit to support Brigade Combat Teams (BCT)/Regimental Combat Teams (RCT) in understanding the human terrain in which they operate. The overall project context for MAP-HT is development and deployment by, through, and with deployed units in theaters of operations. The primary outputs to be demonstrated to the users and evaluated in the Military Utility Assessment are: (1) provide a web services application toolkit to collect, disseminate, analyze, and visualize socio-cultural information in geospatial and social network contexts at the non-classified and secret levels, (2) provide standard operating procedures (SOP) and concept of operations (CONOPS) , as well as tactics, techniques and procedures (TTP), (3) provide training on-line and manuals on the use of the system, (4) establishes direct cultural support to BCT/RCT commanders, civil affairs and interagency end-users, which will minimize loss in continuity between unit relief in place/transfer of authority. (U//FOUO) The MAP-HT Transition Sponsor is USA Distributed Common Ground Station Program of Record (DCGS-A POR). The sponsoring Combatant Command (CoCOM) is U.S. Central Command (CENTCOM). Other involved organizations include the U. S. Marine Corps, U. S. Special Operations	2.700	1.200	0.000	

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Command (USSOCOM) and the U.S. Army Civil Affairs and Psychological Operations Command. The U.S. Army is the lead organization. *FY 2008 Accomplishments:* Technical demonstration of spiral 1 capability. Modified technical and transition paths for application to a web services portal accessible by users on the unclassified networks. Incorporated civil affairs forces into the operational concepts document. Prepared integrated assessment plan with Operational Manager. Conducted oversight group review to determine changes necessary to the technical path and technical team. *FY 2009 Plans:* Revise Management & Transition Plan to incorporate changes determined by oversight group. Integrate, demonstrate and assess spiral 2 capability and provide interim capability for fielding. Develop spiral 3 capabilities and associated assessment plan and conops. Complete the JCTD. FY 2010 Transition Strategy to DCGS-A.				
Maritime Auto Super Track enhance Reporting (MASTER) The Joint Requirements Oversight Council (JROC) validated the capability need for MASTER (Maritime Automated Super Track Enhanced) as an FY 2007 new start. The initial goal of MASTER is to demonstrate a set of technologies with associated CONOPS, which provide automatic tracking of ship traffic using both unclassified and classified methods and which will provide a tangible improvement of United States maritime domain awareness on a global-basis. The MASTER JCTD will also provide a common set of Tactics, Techniques and Procedures (TTPs) to the Intelligence Community (IC) that will allow adoption of this new capability across the IC. The primary outputs and efficiencies to be demonstrated in the Military Utility Assessment (MUA) are to develop and deploy a persistent maritime awareness capability for the analyst, warfighter and decision maker that enables: (1) significant increase in worldwide, multi-INT vessel tracks using information sources from SCI/Secret/Unclassified-levels and dissemination of these "Super Tracks", to operational users at the JWICS and Secret security levels; (2) percent decrease in the time required for an intelligence analyst to assemble the maritime awareness	5.600	3.100	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
picture of ships using track , cargo and people information ; (3) percent increase in the ability of an analyst to determine ship threat profile (friend or foe) based on ship track, cargo and people information at the JWICS level; (5) percent increase in number of maritime awareness entities (ship, people, cargo, infrastructure) and the ability to manually and automatically fuse the data. The JCTD Residuals include: 1) Multi-INT fusion for worldwide MDA tracks with associated metadata; 2) web portal at the JWICS level; 3) SOA at JWICS level; 4) Alarms/alerts notification methodology; 5) Operationally tested CONOP for a 24/7 worldwide capability. MASTER is a three-year JCTD under the sponsorship of US Northern Command (NORTHCOM) and U.S. Navy, with completion of development and demonstration by the end of FY 2009 and transition to the IC through Office of Naval Intelligence beginning in FY 2009. The lead Service is Navy. *FY 2008 Accomplishments:* Developed worldwide multi-INT tracking, enhanced web portal, cargo information at the JWICS level. Created initial JWICS level SOA, linkage of vessel and cargo alerts; conducted technical demonstration One & Two; conducted operational demonstration One. *FY 2009 Plans:* Conduct Technical Demonstration Two; Conduct Final Operational Demonstration of MASTER with enhanced techniques for analytical user, and transition and operational users; publish Joint Military Utility Assessment (JMUA). Complete the JCTD.				
Medical Situational Awareness in Theater (MSAT) The Joint Requirements Oversight Council (JROC) validated the capability need for MSAT as a FY 2005 new start. The outcome is to provide improved capabilities for medical situational awareness to commanders with integrated and timely health information fused with non-medical operational information incorporating a tailored decision support tool to make critical strategic and tactical decisions in a deployed environment. This capability will provide a fusion of medical data, personnel location information and health threat intelligence for situational awareness in theater. The capabilities include technologies for a web services environment fusing intelligence, chem.-bio threat, environmental health, unit location information; risk assessment; and decision support tools. The primary outputs to be demonstrated to	2.500	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
the users and evaluated in the Military Utility Assessment (MUA) are 1) ability to perform surveillance of medical threats in deployed environments, 2) model threat dynamics, and 3) conduct risk assessment using decision support tools. The efficiencies to be gained are 1) the ability to provide commanders with a more complete medical situational awareness in an actionable time-frame, 2) the ability to make knowledge-based decisions with an automated decision-making tool tailored to medical operations. The transition strategy is to incorporate MSAT system tools and operational concepts, tactics, techniques and procedures into theater medical operations through the Theater Medical Information Program - Joint Program of Record, now re-named as Defense Health Information Management System. The sponsoring Combatant Command (CoCom) is U. S. Pacific Command (PACOM). Other organizations involved as participants, users of capabilities, and/or observers include: Armed Forces Medical Intelligence Center; OSD Health Affairs; and the Joint Staff Surgeon. The executive agent is the Joint Staff, Logistics Directorate, Health Services and OSD Health Affairs. *FY 2008 Accomplishments:* Completed Spiral 1 capability and demo assessment. Completed technical test of Spiral 2 development. FY 2009 Output has been funded with "two year" FY 2008 and partnership funding. ACTD completion.				
Medusa The Joint Requirements Oversight Council (JROC) validated the capability need for Medusa as an FY 2008 rolling start. The Medusa JCTD will demonstrate the employment of the Low Cost Guided Imaging Rocket (LOGIR) aboard the US Navy_' MH-60S helicopter against a multi-axis simultaneous attack from Fast Attack Craft (FAC) and Fast Inshore Attack Craft (FIAC). In this manner, US and coalition surface ship formations may protect themselves against coordinated asymmetric threats in a maritime environment. This capability will provide a leap ahead of current ship self-protection options, and contribute to a multi-layered, scalable maritime defense strategy. Additionally, the technology is readily adaptable for use against land-based targets. The initiation of the JCTD has been delayed until FY 2009. *FY 2009 Plans:* Design of the of the launcher and rockets aboard the MH-60 aircraft, with preliminary demonstrations in FY 2010.	0.000	5.638	5.977	

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FY 2010 Plans: Complete the design and integration of the launcher and rockets aboard the MH-60 aircraft. Complete preliminary demonstrations.				
Multi-Function Threat Detector (MFTD)	3.700	2.800	0.000	
The Joint Requirements Oversight Council (JROC) validated the need for MFTD JCTD capabilities as a FY 2008 new start. The output of MFTD JCTD will be to provide indication, warning, or situational awareness to the pilot or aircrew of non-guided threats such as small arms fire, tracer fire, anti-aircraft artillery fire, and rockets/rocket propelled grenades (RPGs). The efficiencies of MFTD JCTD will be to reduce significant and unacceptable vulnerabilities to highly proliferated battlefield threats to include MANPADs, RPGs and Unguided Rockets (UR). MFTD JCTD expands aircraft MWS to include Hostile Fire Warning (HFW) from MANPADS, RPGS, URs and incoming Surface-to-Air Fire from small arms to Anti-Aircraft Artillery. MFTD JCTD will develop software algorithms to detect, characterize, and display unguided threats to the aircrew. MFTD JCTD plans to develop an infrared micro-lens optics package that provides simultaneous spatial and temporal co-registration of spectral images. The HFW algorithm will not degrade the current operational performance of the Missile Warning (MW) or LW Sensors.				
FY 2008 Accomplishments: MFTD JCTD started in July 2008, published Implementation Directive & draft Management Plan & Program Risk Assessment.				
FY 2009 Plans: Conduct the MFTD JCTD module demonstration with MFTD sensor module mounted on tripod and tested against HFI threats. Test data to be acquired and analyzed.				
FY 2010 plans will be accomplished with FY 2009 "two year" funding and partnerships. MFTD JCTD will be integrated into AAR-47 sensor head as HFI detector demo with the planned demonstration venue at				

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China Lake. It will test the HFI system installed in a remotely controlled helicopter in self-powered hover under realistic flight loads and against actual threats at and around the helicopter in-hover to assess accurate HFI. Recorded measured data to determine project operational utility, provide for system integration, and expedite flight qualification. The final demonstration and OUA will be conducted in a flight simulator in FY 2010. MUA Acquisition/Transition Strategy: MFTD JCTD is targeted to transition into the Navy AAR-47 Program of Record (POR). First, the MFTD JCTD module will be integrated into the AAR-47C(V)1 sensor, and fielded to those aircraft that currently are outfitted with the AAR-47. Also, since the MFTD JCTD technology potentially compliments the Joint and Allied Threat Awareness System (JATAS) program will look at the MFTD JCTD HFI technology during the JATAS program RFP process which is estimated to go out in early FY 2009.				
Multi-Sensor Aerospace-ground Joint ISR IC (MAJIIC)	1.100	0.000	0.000	
The JROC approved the capability need for MAJIIC as an FY 2004 new start. The outcome of MAJIIC is to develop, test and transition a set of standards, eXtensible Markup Language (XML) formats, and information services to promote intelligence, surveillance and reconnaissance (ISR) interoperability between U.S. and Coalition ground stations and systems. MAJIIC will demonstrate near-real-time interoperability of data from electro-optical, infrared, motion video, moving target indicators, synthetic aperture radar, and other sensors; enhance collaborative targeting operations; improve ISR data accessibility and sense making to support U.S. Joint ISR operations. Outputs and efficiencies include: 1) Near real-time MAJIIC ISR mission and sensor data is available for discovery and smart pull within the Collateral Space in near real time (i.e. Post in Parallel); 2) MAJIIC services and data are readily discoverable via portals, C2 Visualization and other applications, and other Global Information Grid (GIG) service providers; 3) MAJIIC data pedigree is trustable by users; 4) MAJIIC service access is assured for authorized users and denied for unauthorized users; 5) MAJIIC data access is provided based on user clearance, country affiliation, and role and protected from those not meeting the minimum policy requirements. Transition is planned for FY 2008 by the U.S. Army Training and Doctrine Command (TRADOC) System Manager to the Service Distributed Command Ground Station (DCGS) programs,				

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to satisfy their requirements for coalition ISR interoperability and Network Centric Enterprise Services compatibility. Transition already Accomplished: The MAJIIC Full-Motion Video ISR Information Services (ISRIS) capability deployed as part of JIOC-I to OIF, and is transitioning to the Army Distributed Common Ground System (DCGS-A). NATO is deploying the MAJIIC coalition shared database (CSD) as part of the NATO Intelligence Management and Reporting Tool (IMART) to OEF. Remaining transition: NATO, Supreme Headquarters Allied PowerEurope (SHAPE), and the U.S. will adopt demonstrated capabilities and concepts of operation into existing national and coalition systems. MAJIIC technology and lessons learned will transition to the Service DCGS programs to satisfy their requirements for Coalition ISR interoperability and Network Centric Enterprise Services compatibility. U.S. Joint Forces Command is the operational sponsor and the Air Force is lead service. *FY 2008 Accomplishments:* Participated in the annual MAJIIC coalition exercise with possible NATO Allied Command transformation with NATO Air Group IV ISR capability. Validated CONOPs and conduct MUA. Transition capability into the DCGS Integration Backbone spiral baseline. ACTD completed at the end of FY 2008.				
Net Zero Plus (NZP) The Joint Requirements Oversight Council (JROC) validated the capability need for Net Zero Plus (NZP) as an FY 2008 new start. The outcome of the NZP JCTD is to demonstrate and assess reduced fuel demand, improved infrastructure and alternative energy supply seamlessly provided to the warfighter. This will be accomplished by reducing external fuel requirements for facilities/forward operating bases and reducing risk to coalition lines of communication, i.e., reducing delivery of fuel to bases and facilities by soldiers, sailors, airmen, and marines. NZP leverages research and development from federal and private labs and COTS/GOTS technology in alternative fuels, novel power storage, innovative power generation, brilliant distribution systems, efficient structures, collection, analysis, and visualization technology. The combined capabilities will establish an energy efficient Forward Operating Bases blueprint that may be utilized by tactical elements, operational commanders, theater planners, interagency organizations, and coalition partners. The emphasis will be on replacing or improving temporary living, office, and operational facilities with energy efficient structures and integrating renewable energy technologies with improved energy generation to power those structures. NZP JCTD is a three-year demonstration under	2.500	2.436	2.500	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
the sponsorship of U.S. CENTCOM with the completion of the demonstration by end of FY2010; and transition to programs of records as early as 2010. The lead Service is the Army. The primary outputs and efficiencies to be demonstrated in the JCTD Military Utility Assessment (MUA) are: the performance of alternative structures, distribution and supply with metrics measuring the number of kilowatts used with a goal of 40 percent reduction the first year, 50 percent in the second year and 60 percent the third and final year along with a integrated DOD energy strategy and roadmap. The planned schedule is to conduct utility assessments in FY08 and FY09 to achieve Final Demonstration, Completion and Transition FY 2010. After completing a demonstration, a technology will be spiraled, transitioned, or ended due to lack of operational utility. Demand, Infrastructure, and Supply technologies are planned for transition to Mobile Electric Power Program of Record, PEO (Combat Support and Combat Services Support) Force Provider Program of Record, and placed on the General Services Administration (GSA) Schedule or Defense Logistics Agency (DLA) acquisition. *FY 2008 Accomplishments:* Installed survey and monitoring equipment for baselining FOB operations; initiated exterior insulation of structures; examined tactical garbage to energy refinery; began development of CONOPS and TTPs. *FY 2009 Plans:* Complete exterior insulation of structures; install intelligent generator sets and electronic power control and conditioning for smart distribution systems; demonstrate intelligent power distribution to optimize efficiency's. *FY 2010 Plans:* Expand intelligent power distribution with integration of Waste to Energy system and Hybrid Power Generation into intelligent power distribution; conduct final Military Utility Assessment; develop Net Zero-				

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Plus strategy and road map for FOB and U.S. installations. NZP JCTD scheduled completion date is September 2010.				
Night Vision Cave/Urban Assault (NVCUA) The Joint Requirements Oversight Council (JROC) validated the capability need for NVCUA. The outcome of NVCUA is to demonstrate a suite of lightweight, soldier-borne sensor technologies, together with new Concepts of Operation (CONOPs) and Tactics, Techniques and Procedures (TTPs), to enable decisive overmatch for dismounted assault in subterranean and urban environments. Five-year project under sponsorship of U.S. Special Operations Command (USSOCOM), with completion of development and final demonstration in FY05, and final completion date in FY 2008. The lead service is U.S. Army. The primary outputs and efficiencies to be demonstrated in the Night Vision ACTD Military Utility Assessment are: 1) Increased capability for Special Operations Forces (SOF) to identify detected targets during Special Reconnaissance (SR) missions; 2) Increased capability for SOF during Direct Action (DA) missions; 3) Enhanced SOF capabilities to move and identify targets in low/no-light environments; 4) Enhanced SOF capabilities to move and identify targets in urban/restrictive terrain. Current Efficiency Goals: SWIR Standoff Identification Range - 2k = IR Detection Range; UCIR Detection Range (Cave Assault) 150m, 200m, 250m; UCIR Detection Range (Urban UGS) - 15m, 25m; Pd (Approach Sensors) -- 90 - 95 percent; STTW Detection Range -- 10m, 20m. Transition status: Long Range Identification (LRID) system was successfully demonstrated and is currently undergoing an Extended User Evaluation in Iraq for consideration for transition to Army Programs of Record (POR). Additionally, the NVCUA ACTD developed and demonstrated a Fast Obscurant Grenade (FOG) which Transitioned to the U.S. Army Joint Program Manager NBC Program Of Record and recently was approved for Milestone C procurement status. In addition, efforts are underway to provide selected items (e.g., Combat Periscope, ENV Goggles) for operational use on a rapid-equipping basis. *FY 2008 Accomplishments:* Completed interim capability/residual support. Completed transition to designated Programs of Record. Completed the ACTD.	0.600	0.000	0.000	
Node Mgt and Deployable Depot (NoMaDD)	2.500	0.000	0.000	

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The Joint Requirements Oversight Council (JROC) validated the capability need for NoMaDD as a FY 2006 new start. The outcome of NoMaDD is to demonstrate technologies which address critical delays in getting needed supplies to the warfighter. Loss of visibility of items in the distribution pipeline and the inability to provide realistic delivery dates or effectively adjust the flow of commodities for delivery at the right place at the right time continue to impact the effectiveness of our forces. Node Management will provide distribution node managers the visibility needed to make logistics decisions to positively affect the distribution system. Deployable Depot will provide the ability to quickly establish a supply and distribution center in theater to control the physical flow of materiel moving into and through the theater. Together, these capabilities will provide the logistic responsiveness necessary to support our warfighters in any theater of operation. NoMaDD's effectiveness will be measured through its contribution to sustained logistics for major military deployments. Specific outputs and efficiencies will include: 1) increased accuracy in accounting for supplies resulting in reductions in customer wait time; 2) improvements in required airlift to support sustainment; 3) reductions in repeat requisitions. The planned transition for NoMaDD: Node Management will transition to the Army's Battle Command Sustainment Support System and U.S. Transportation Command's (TRANSCOM) Intelligent Road/Rail Information System (IRRIS) Program which will provide a web based version on Node Management. The Deployable Depot will become a program of record and be managed by DLA. The Combatant Command/User Sponsor is TRANSCOM and the lead service/agency is Defense Logistics Agency (DLA). *FY 2008 Accomplishments:* Performed the final Joint Military Utility Assessments of the Deployable Depot in March - April 2008. Continued spiral development of BCS3 Node Management capabilities and development of the IRRIS web-based capability. Integrated BCS3 and IRRIS capabilities to ensure data and views are consistent. Development and integration of BCS3 and IRRIS Node Management Capabilities continued as a joint DLA/USTRANSCOM project. JCTD completed in September FY 2008.				
Regional Maritime Awareness Capability (RMAC)	3.500	0.000	0.000	
The JROC approved the capability need for RMAC as an FY 2006 new start. RMAC is a coordinated DoD and Department of State project to build maritime awareness capacity for friendly nations. The outcome of RMAC will demonstrate and transition a regional maritime awareness solution set consisting				

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of sensors and their indigenous processors, communications systems, and software, suitable for nations with little or no previous maritime awareness capability. The initial application of the capability will enable friendly nations in the Gulf of Guinea region to develop maritime domain awareness in the regional waters, and share their data with each other and with the U.S. This solution set will be equally applicable to local sensor sites, national operations centers, regional coordination centers, and external users. The sensors and processors include Automated Information System (AIS), surface search radars, video cameras, and night vision devices. Communications will be done through UHF/VHF Radios, W3C-compliant, commercially secure, IP-based networks and cell phones. RMAC's outputs and efficiencies include surveillance, tracking, fusion and analysis, vessel tracks, and multi national information sharing and collaboration capabilities. The current Transition Strategy will deliver: 1) Residuals: AIS, radars, video cameras, night vision devices, radios, cell phones; 2) Documentation: training package, software / hardware specifications, site surveys, frequency management plan and user maintenance manuals, CONOPS / TTPs; 3) Post-JCTD acquisition strategies for procurements of capability will be developed by host nations and U.S. Program Managers pending outcome of demonstrations and assessments. The User Sponsor is the U. S. European Command (EUCOM) and the lead service is the Navy.				
FY 2008 Accomplishments: Finalized requirements definition and architectures for Nigeria installations. Completed installation of RMAC capability in Nigeria. Continued development of CONOPS, TTP, and training packages. Conducted operational demonstration and Coalition Utility Assessment (CUA) of RMAC capability in Sao Tome and Principe, planning for operational demonstration and utility assessment of capabilities in Nigeria, and data sharing between Nigeria and Sao Tome and Principe. Sao Tome and Principe built up their Coast Guard around RMAC capabilities, and used the system as its core maritime awareness capability in daily operations.				
FY 2009 Planned Output will be funded with "two year" FY 2008 funding and partnerships. Execute second operational demonstration, with capabilities in both Nigeria and Sao Tome and Principe. Complete utility assessment. Support transition activities for US Navy program of record, and sustainment in partner nations. Complete the JCTD.				

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SPARTAN Advanced Composite Technology	1.600	0.000	0.000	

The Joint Requirements Oversight Council (JROC) validated the capability need for SPARTAN as a FY 2002 start. The outcome is to provide a modular, multi-mission, unmanned surface vehicle (USV) used to deploy sensors and weapons as low-cost force multipliers with integrated expeditionary sensor and weapon systems for use against asymmetric threats. The expanded range provides a layered defense, early warning/intercept capability for incoming threats, thereby improving protection of surface combatants, noncombatants, and other national and strategic assets. The user sponsor is U.S. Pacific Command whose Operational Manager is the U.S. Third Fleet, lead service is the U. S. Navy. The primary outputs to be demonstrated to the users and evaluated in the Military Utility Assessment (MUA) are 1) Conduct critical missions Antisubmarine Warfare (ASW); Mine Warfare (MIW); Intelligence, Surveillance, and Reconnaissance/Force Protection/precision Engagement (ISR/FP/PE); 2) Prepare the water space for Amphibious and Sealift Ops; and 3) Provide port-protection when launched/operated from shore. The efficiencies to be gained are 1) force multiplication using low-cost deployable sensors and weapons; 2) provide a symmetric response to asymmetric threats; 3) expanded range to provide for a reduced risk to personnel and capital assets during the conduct of dangerous missions. The Transition Strategy: The SPARTAN USV Command and Control system and Concept of Operation (CONOPS) will transition to the U.S. Navy Littoral Combat Ship (LCS) (PEO-LMW, PMW 420) Program of Record (POR) for the LCS USV. Transition is scheduled to begin with LCS Flight Zero, Ship number One production in January 2007. The ACTD officially completed in FY 2006, however a $1.300 million congressional add was provided in the ACTD PE in FY 2007 for composite technology research to support Navy transition efforts into the LCS program of record.

FY 2008 Accomplishments:

Congressional funding was added to continue composite technology development for Spartan. The effort encompassed three phases in the evaluation and characterization of advanced composite materials for Spartan and future USV applications. Phase 1: USV Payload/Sensor Performance Improvement - payload/sensor improvement efforts included an FEM analysis that was be conducted with known properties of structural components. Early and later full-scale testing was conducted on prototype and full-scale payload/sensor hardware and the supporting platform interface foundations. Material Characterization was conducted to evaluate performance of the materials. Static and dynamic material

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response will be characterized to validate the FEM analysis. Volume fraction optimization and material processing/fabrication techniques were investigated. A Final Design and FEM analysis was conducted using new material properties. "Build-to" drawings was developed after the design was finalized. At-sea testing was conducted with packages installed on a SPARTAN USV (or next-generation SPARTAN platform) under operationally representative conditions. Test instrumentation were used to record load conditions. Phase 2: Electronic Sensors/Payload - following successful completion of Phase 1 in it intended to assess, design, fabricate and test additional mission/payload components (structural and non-structural) of more complex shapes and configurations used in SPARTAN including electronics and sensor enclosures. Also in this phase is the potential to explore the need to meet low-smoke requirements.				
Sea Eagle The Joint Requirements Oversight Council (JROC) validated the capability need for Sea Eagle as an FY 2005 start. The outcome of Sea Eagle will be to demonstrate and transition technologies to provide persistent, clandestine, and unattended monitoring of maritime areas in a Special Operations Forces (SOF) deliverable "system of systems". These sensors and systems will be deliverable by SOF and networked in a multi-media (sea, air, land) system-of-systems approach. Sea Eagle will greatly increase SOF's ability to clandestinely conduct persistent, intrusive Intelligence, Surveillance, and Reconnaissance (ISR) in maritime areas. The war fighter will tactically emplace Sea Eagle systems to provide targeted, tactical information that complements national and theater intelligence assets to enable a layered intelligence collection strategy. These funds will be used to support technical down-select, systems integration, and demonstrations of sensors and communication technologies. The funds will support: 1. Johns Hopkins University Applied Physics Lab (JHU APL) and Naval Surface Warfare Center Panama City (NSWC PC) as the technical integrators for Sea Eagle; 2. Operational Manager support and demonstration costs; and 3, Procurement and integration of components for the demonstrations. Outputs and Efficiencies.	0.800	0.000	0.000	

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The overarching output for Sea Eagle is persistence. This output incorporates a variety of initiatives such as power management, intelligent triggering, and signal discrimination to optimize system performance and persistence. Measures of persistence will be relevant for individual component, subsystem, and overall system performance. Quantitative metrics are classified. USSOCOM is the COCOM/User Sponsor; Navy is the Lead Service. *FY 2008 Accomplishments:* Incorporated underwater communications and sensors into a clandestine, close access, ad-hoc, self-healing mesh network. Demonstrated the undersea network and sensors in 3Q FY 2008. Conducted final Military Utility Assessment of the entire Sea Eagle network 3Q FY 2008. Upgraded land network protocol and integrated additional land sensors. Refine CONOPS and TTPs. The ACTD was completed in FY 2009. FY 2009 Planned Transition to U.S. SOCOM Global Sensor Network POR.				
Shadow Harvest The Joint Requirements Oversight Council (JROC) validated the capability need for SHADOW HARVEST as an FY 2008 new start. The outcome of the SHADOW HARVEST JCTD is to provide Combatant Commands an integrated, joint airborne capability to provide persistent surveillance to consistently, accurately and efficiently find, fix, track and target enemy assets obscured by weather, vegetation, camouflage, concealment and/or deception (CC&D). The program leverages the Defense Intelligence Agency's (DIA) SHADOW HARVEST C-130-based program along with several maturing sensors and relevant networking/data fusion/recognition technologies. SHADOW HARVEST will provide a timely and low cost C-130-based approach to integrate, operationally deploy, and demonstrate new sensor processing, exploitation, and dissemination (PED) capabilities into the intelligence production cycle and will require fewer personnel, reduce or eliminate dependence on specialized collection platforms, mitigate the problems associated with equipment standardization and minimize the impact on the maintenance infrastructure. The goal of this JCTD is to transition a mature system, architectures, flexible adaptive CONOPS and platform which will allow for flexible airborne remote sensing in a tactical or irregular warfare	5.500	6.100	0.000	

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environment. SHADOW HARVEST will be compatible with intelligence community, DoD and COCOM requirements and will provide a rapid to-the-field development capability for future sensor systems. SHADOW HARVEST is a two-year project sponsored by USSOUTHCOM, and the JCTD is scheduled to be complete by the end of FY 2009. It will transition to selected Program Manager(s) / Program of Record(s) by FY 2012. The lead service is the US Air Force. The DIA is the lead agency responsible for organizing a multi-agency, multi-service team for the JCTD. The primary outputs and efficiencies of the JCTD Joint Military Utility Assessments are: (1) Conduct multiple airborne mission demonstrations against challenging CC&D/OTs using a tailorable C-130 multi-sensor system complete with on-board multi-phenomenology data fusion and ground PED, (2) Demonstrate and assess sensor cross-cueing/ collaboration techniques for both baseline/new electro-optical/radar sensors and maturing MASINT sensors (to include low frequency/Multi-Band Synthetic Aperture Radar (MB-SAR), and hyperspectral imaging (i.e., Spectral Infrared Remote Imaging Transition Testbed (SPIRITT)), (3) Demonstrate dynamic in-flight mission tasking against emerging/evolving target sets, (4) Publish an OUA of the capabilities demonstrated and develop joint CONOPS and TTPs for COCOM target sets that will help the MAJCOM to develop sensor-mix strategies for COMCOM Target sets/missions and develop theater specific CONOPS to enable new collection capabilities to be integrated into the COCOM intelligence production cycle, (5)Maintain operation readiness, in flight status, for Extended Use of Residuals (EUR) assets to include a DIA SHADOW HARVEST system available for USAF and DIA tasking until transition to POR. *FY 2008 Accomplishments:* Successfully completed second test flight series in December 2007. Conducted flight support to US NORTHCOM by conducting flights over burned areas from October 2007 California wildfires. Conducted demonstration of concept of support to USNORTHCOM's Operation CLEAR VIEW requirements and DoD Support to Civilian Authorities (DSCA). Conducted a limited military utility assessment in USSOUTHCOM's AOR during 3QFY08. Complete the coordination of the Implementation Directive. *FY 2009 Plans:* Coordinate the Management Plan (to include initial transition plan) and begin final system integration activities. Coordinate and plan demonstration activities to requested CoCom AOR. FY 2010 Planned				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Activities will be funded with "two year" FY 2009 funds and partnerships and will conduct the final demonstration in a CoCom's AOR and complete the JCTD.				
Simultaneous Field Radiation Tech (SFRT) Congress appropriated funds to develop a new type of antenna for use on radio-frequency (RF) communications devices. The emergent research proposed use of cylindrical RF antenna forms to reduce antenna profile and length while improving antenna gain. The outcome of Simultaneous Field Radiation Tech (SFRT) is to develop and demonstrate improved antennas for tactical radios in the High Frequency, Very high Frequency and Ultra High Frequency radio bands. The capabilities proposed for development in this technology program will improve communications capabilities while reducing antenna visibility. Navy is participating in developing and demonstrating the new antenna functionality. The primary outputs and efficiencies to be demonstrated are improved tactical communications. SFRT output is certified antennas for at least two classes of tactical radios. The efficiency is that mobile users will have improved communications while enjoying more covert antenna profiles. Simultaneous Field Radiation Tech (SFRT) will transition to a commercially available product line for use by any executive department agency requiring tactical communications. *FY 2008 Accomplishments:* Developed, demonstrated and productized new antenna technology. Applied the antennas to legacy radios to demonstrate improved gain and reduced profile.	3.100	0.000	0.000	
Small UAV (SUAV) The JROC approved the capability need for SUAS as an FY 2006 new start. The outcome of SUAS is to address Joint operational concerns noted during on-going operations through the integration of new technology across the entire class of Small UAVs. The outputs and efficiencies to be demonstrated are: technology insertions to provided measurably improved performance/logistical support in the following areas: Command, Control and Communications (C3); Payload Integration; Targeting; Platform Related Issues (power, propulsion, etc.); improved operator training though the use of integrated training programs with emphasis on simulation; improved and more efficient Tactics, Techniques, and Procedures (TTP) across the Services for small unit real-time reconnaissance and surveillance capabilities. New operational	3.700	1.700	1.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
capabilities will be evaluated and no less than once per year. Transition strategy: FY 2009/2010 is the transition period. The capabilities will be integrated into USSOCOM systems, and available for integration into all SUAS customers assets (spiraled out of the ACTD into the field as they become available). The User Sponsor and Lead agency is U.S. Special Operations Command (USSOCOM). *FY 2008 Accomplishments:* Continued technology definition and cut in (spiral fielding). Continued TTP development and refinement. Continued CONOP refinement. Performed one limited assessment, one Interim Military Utility Assessment to support fielding of capabilities. . *FY 2009 Plans:* Military Utility Assessment (MUA) - Perform the final (culminating) assessment, capturing overall improvement to operational capabilities, Extended Use (EU) and transition support of fielded technology and training packages will continue. *FY 2010 Plans:* MUA reporting, Extended Use (EU) support of fielded technology and training packages will begin. The ACTD will complete in FY 2010.				
Smart Threads Integrated Radiation Sensors (STIRS) The Joint Requirements Oversight Council (JROC) validated the capability need for Smart Threads Integrated Radiological Sensors (STIRS) Joint Capabilities Technology Demonstration (JCTD) as an FY 2007 new start. The objective of the is to demonstrate and transition the capability to detect, identify, and disseminate radiological information on l and, maritime, and airborne environments in order to enhance combating weapons of mass destruction operations. The capability suite will use a combination of proven and innovative radiation detection capabilities, networked through open-architectures, to aid in counterproliferation and consequence management missions. These capabilities have global applicability with forward-deployed Combatant Command (COCOM) ground forces (US Army), U.S. Naval Maritime Components, and US Coast Guard elements in the transient areas.	6.100	4.700	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
In all mission areas, the systems will be capable of being networked and radiological information can be provided through existing tactical, operational and strategic command and control (C2) networks. The is a three-year JCTD sponsored by the US Northern Command (NORTHCOM); DTRA is Lead Agency and US Naval Sea Systems Command (NAVSEA O4LR) and the Joint Program Executive Office for Chemical and Biological Defense (JPEO CBD) are co-Transition Managers. The operational demonstration/exercise (ODX) phase will complete in FY 2009 and transition will begin in FY 2009 through FY 2010. The capabilities and attributes below are the basis for the Joint Operational Utility Assessment (OUA) measures of effectiveness (MOEs) and measures of performance (MOPs): a. Detect and identify concerning R/N material/threats. - Attributes: precision, spectrum, quality, timeliness. b. Correlate and fuse information to develop shared understanding. - Attributes: quality, scalable, tailored to users. c. Enable support of/execution across, spectrum of battlefield environments (land, sea and airborne). - Attributes: robustness, persistence. d. Collaborative, networked joint and interagency information sharing. - Attributes: networked, interoperable, and fully integrated. *FY 2008 Accomplishments:* Requirements validation and refinement of STIRS JCTD capabilities into man-portable detection systems (MPDS) and vehicular mounted detection systems (VMDS) to confirm presence of R/N materials and identify the same; began STIRS integration into service and joint C2 networks to send STIRS data to required users in near real-time; conducted initial MPDS technical testing and system characterization. Continue MPDS technical testing followed by technical demonstrations with operational unit training; Plan operational demonstrations/exercises (ODX) with US Navy Level I, II and III Boarding Teams employing MPDS capabilities.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Conduct operational demonstrations/ exercises (ODX) with US Navy Level I, II and III Boarding Teams (MPDS capabilities); Conduct VMDS technical testing followed by technical demonstrations with operational unit training; Plan and conduct operational demonstrations/exercises (ODX) with 20th Support Command (CBRNE) for both MPDS and VMDS capabilities; Conduct Aerial Radiation Detection, Identification and Measurement System (ARDIMS) technical testing and system characterization, followed by unit training; plan and conduct operational demonstrations/exercises (ODX) with 20th Support Command (CBRNE) for ARDIMS capabilities, supporting/interdiction missions, and post-event radiation mapping/detection, utilizing manned and/or unmanned aerial platforms. Complete the JCTD. The FY 2010 Transition Strategy – begin Extended Use activities, continue with transition of STIRS JCTD capabilities to Programs of Record (POR).				
Special Operations Forces (SOF) Long Endurance Demonstrator (SLED) The JROC validated the capability need for SLED as an FY 2005 new start. The outcome of SLED is to demonstrate an unmanned vertical take off and landing vehicle (the DARPA developed A160 Hummingbird VTOL UAV) capable of flying long range (2000+NM/24+ hours) and employing a wide variety of adaptable payloads, supporting combating terrorism (CT), counter proliferation (CP), special reconnaissance (SR), direct action (DA), psychological operations (PSYOP), and other mission areas. Efficiencies and outputs will be evaluated the A160 for its capability to perform designated functions. Platform performance must be compatible with payload and mission requirements in terms of altitude, endurance, range, weight (platform and payload), and payload power. The payloads must meet mission requirements and be compatible with A-160 capabilities and constraints. Planned Transition is to integrate with USSOCOM components. U.S. Special Operations Command is the user sponsor and lead agency. *FY 2008 Accomplishments:* Completed final MUA activities and reports. Updated CONOPs. Performed Extended User Evaluation. Completed the ACTD.	5.000	0.000	0.000	
Tactical Service Provider (TSP)	3.700	3.700	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
The Joint Requirements Oversight Council (JROC) validated the need for TSP functionality for a FY 2007 new start. The TSP ACTD takes advantage of the Joint IP Modem (JIPM) and emerging wireless commercial technologies to enhance and improve C2 and Net-Centric capabilities to meet critical present and near-term requirements. TSP plans for a final demonstration and assessment in the fourth quarter of FY 2009, with sustainment of the demonstrated capabilities by DISA through FY09 and transition to the Global Broadcast Service (GBS) program of record in FY 2011. TSP outcome will enable broadband communications between strategic information sources and tactical users as well as between tactical users. The expected output is wideband SATCOM multicast/broadcast of information products with lower data rate reachback SATCOM supporting two-way services for tactical users. The expected efficiency is substantial increase in delivery of tactically relevant command and control and intelligence-related information products to land mobile troops, and the near real time delivery of tactically generated information to operational and strategic echelons. TSP is a three year ACTD co-sponsored by USCENTCOM and USJFCOM. The Defense Information Systems Agency (DISA) is the lead agency. *FY 2008 Accomplishments:* Conducted limited functionality technology demonstrations as operational users refined specific functionality needed for mission thread assessment scenarios. Efficiencies expected include enhanced situational awareness, real- or near-real-time intelligence sharing, and more agile and effective combat force with collaborative capabilities at the "tactical edge" to and from mobile troops. *FY 2009 Plans:* Demonstrate militarily useful functionality in operationally relevant scenarios. Conduct operational utility assessment. Finalize documentation and transition functionality to programs of record. Complete the JCTD.				
Theater Effects Based Operations (TEBO) The Joint Requirements Oversight Council (JROC) validated the capability need for the TEBO ACTD as a new start in FY 2004. The outcome of the TEBO ACTD is to provide Combatant Commanders with enhanced capabilities to analyze, plan, execute, and assess Effects-Based Operations (EBO) at the strategic and operational levels by integrating computer-aided decision support tools, Concept of	4.400	2.700	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Operations (CONOPS), and Tactics, Techniques and Procedures (TTPs) into the command's Mission Architectures. The TEBO ACTD is a six-year project under the sponsorship of Pacific Command and Combined Forces Command/U.S. Forces Korea (CFC/USFK) as the Operational User. Completion of development and demonstration is planned for by the end of CY 2009 with transition to the Net Enabled Command Capability (NECC) System of Record in 2010. The lead service is Army. The primary outputs and efficiencies to be demonstrated in the TEBO ACTD Military Utility Assessments are (1) Exploit existing knowledge base(s) of strategic, operational and tactical environments (e.g. Operational Net Assessments [ONA] - critical capabilities and vulnerabilities, centers gravity [COG] and nodal analysis, (2) Facilitate collaborative effects-based campaign planning within a combined/Joint environment, (3) Support execution with prioritization of strategic and operational levels of effort, synchronization of actions, and battle tracking, (4) Comprehensively assess and forecast progress toward the desired end state by analyzing observed direct and indirect effects. *FY 2008 Accomplishments:* Limited Military Utility Assessment (LMUA) was completed at KEY RESOLVE 2008. Final MUA August 2008. Final enhancement and integration of COA planning capabilities through the use of modeling and simulation. Developed strategic assessment capability to provide interagency, strategic level inputs to the CG operational perspective and improvements to timeline visualization. Synchronization matrix delivered. *FY 2009 Plans:* Integrate with Turbo Planner and modeling/simulation tools to fulfill Adaptive Planning Strategic Guidance requirement for APEX. Transition to Net Enabled Command Capability (NECC) POR as part of KPP#2. Scheduled completion of the ACTD in September 2009. Transition Strategy: FY 2010 User Assessment and participation in UFL 2009. FY 2011 - Transition to NECC as part of Increment 1.				
Transnational Information Sharing - Cooperation (TISC) The Joint Requirements Oversight Council (JROC) validated the capability need for TISC as an FY 2008 rolling start. TISC will provide open source software tools and non-classified portal for collaboration, planning and assessment by external partners and interagency organizations. The TISC capability design allows disadvantaged users to use the portal at no cost and accessibility will be possible in	4.000	3.000	3.000	

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austere and minimal network infrastructure environments. This capability will provide collaborative chat, identity client, trans-lingual text chat and web 2.0 social networking tools. Outputs and efficiencies will include improved planning and response to theater security cooperation challenges and stability and reconstruction operations. Technologies demonstrated will reduce the time and increase the effectiveness of disaster relief, humanitarian assistance and stability operations where DoD, interagency, non-governmental organizations, international organizations, coalition nations and other first responders need to cooperatively act , plan and assess courses of action. TISC initial demonstration occurred in the 2008 Coalition Warrior Interoperability Demonstration events held at multiple locations. USEUCOM and USSOUTHCOM will act as sponsors and Cocom representatives to determine operational requirements, demonstration conduct, assessment and operational concepts. Requirements and operational assessment will include external partners outside of DoD acting as the TISC community of interest. The TISC capability will transition to Theater Security Cooperation operational concepts, tactics and procedures, while the sustainment of the information sharing portal will become the responsibility of DISA, U.S. Government and other international organizations. Since the information technology solution and the associated operating concepts will be open source software and doctrine, the product will be free to authorized users, e.g. United Nations. The user sponsor is U.S. European Command and the lead organization is the Defense Information Systems Agency. *FY 2008 Accomplishments:* Spiral 1 capability demonstrated and assessed in the 2008 CWID. Technical demonstrations refine capabilities for multiple sprints comprised in each spiral. Spiral capabilities defined by operational sponsors and integrated into the TISC instance. Integrated assessment plan developed *FY 2009 Plans:* Spiral 2 and later spirals demonstration and assessment will complete in African Endeavor and Common Endeavor for the EUCOM sponsor. Approval of the Management and Transition Plan. Continuing series of incremental capability technical demonstrations leading to the spiral 2 assessment.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Demonstrate and assess TISC in the SOUTHCOM area of operations in FAHUM 2010 exercise. Prepare final operational utility assessment and report from the sponsors. Transition TISC capabilities and operational concepts to Theater Security Cooperation policy and planning documents and to DISA and other sustaining organizations in DoD, U.S. Govt or others. JCTD completes.				
Zephyr The Joint Requirements Oversight Council (JROC) validated the capability need for Zephyr as an FY 2007 new start. The Zephyr JCTD is a transformational technology program that proposes to demonstrate and transition into service a solar-powered unmanned aerial vehicle to meet urgent operational requirements for USCENTCOM and USEUCOM. The output of Zephyr will be to provide low-cost persistent surveillance and communications relay, flying continuous operations for periods of months at a time using solar power plus batteries for continual day/night operations. The efficiencies of Zephyr's sensors will provide ground radio communications links over hundreds of square miles and surveillance of logistics routes and ground threats. Zephyr is hand launched and requires no formal infrastructure and little manpower to operate. Zephyr solution provides cross-theatre benefits to all U.S. Forces. *FY 2008 Accomplishments:* The development of the JCTD Integrated Assessment Plan (IAP) to include: (1) providing day to day operational management through close coordination with the JCTD Technical and Transition Managers; (2) development and validate Concept of Operations (CONOPS); Concept of Employment (COE); Tactics, Techniques, and Procedures (TTPs), and associate Training Support Packets (TSPs) as needed; (3) management of the assessment activities in support of a military utility decision. Funding also includes support provided by the Operational Test Agency (OTA) to conduct assessments, the Assessment Execution Document (AED). The final demonstration is FY 2008. JCTD Completion: FY 2008 Transition Strategy: Aggressive transition to production is demanded by a USCENTCOM urgent operational requirement in theatre. The Zephyr team is working with QinetiQ North America to transition Zephyr to a U.S. production partner.	6.100	0.000	0.000	

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Suppliers: U.S. and U.K. managers will implement post-JCTD acquisition strategies for all procurements (notably two cutting-edge U.S. technologies/solar array and battery). Residuals: 2 x Zephyr high-altitude, long-endurance unmanned aircraft systems complete with payloads and ground stations. Training package will include deployment procedures and techniques, user maintenance manuals, and concept of operations/tactics.				
Distributed Tactical Communications System (DTCS)	0.000	5.800	5.000	
The Joint Requirements Oversight Council (JROC) validated the need for DTCS functionality for a rolling start for FY 2009. The DTCS JCTD utilize a Single Vehicle Multi Beam Architecture and Iridium satellite communication system to provide a tactical voice and data service to small units (Co and below) using a small handheld device. DTCS plans for a final demonstration and assessment in the fourth quarter of FY 2011, and transition to the Defense Information Systems Agency (DISA) Enhanced Mobile Satellite Service (EMSS) program of record in FY 2011. DTCS outcome will deliver a tactical, scalable OTH/OTM/BLOS small unit focused capability that can be handheld or vehicle mounted to provide tactical voice and narrow band data to disadvantaged users. The expected efficiency is substantial increase in delivery of tactically relevant command and control and intelligence-related information products to land mobile troops, and the near real time delivery of tactically generated information to operational and strategic echelons. DTCS is a three year JCTD sponsored by USCENTCOM. The USMC is the lead Service for operational assessment and early deployment. DISA is the lead Agency for transition and sustainment.				
FY 2009 Plans: Conduct limited functionality technology demonstrations as operational users refine specific functionality needed for mission thread assessment scenarios. Efficiencies expected include enhanced situational awareness, real- or near-real-time intelligence sharing, and more agile and effective combat force with collaborative capabilities at the "tactical edge" to and from mobile troops.				
FY 2010 Plans: Demonstrate militarily useful functionality in operationally relevant scenarios. Conduct operational utility assessment. Finalize documentation and begin to transition functionality.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
One Box One Wire (OB1)	0.000	8.100	6.000	
The Joint Requirements Oversight Council (JROC) validated the need for OB1 functionality for a JCTD rolling start for FY 2009. The OB1 JCTD outcome will be a generic computer workstation using a secure operating system separation kernel, virtual machine technology, and encrypted network communications path to enable a user to access multiple computer networks and information services operating at different levels of security from Top Secret through Unclassified from a single computer workstation. The information layers are kept separate. OB1 consolidates the network infrastructure from multiple terminals and network cabling at individual workstations to a single terminal connected to multiple data centers via one wire (network cable) – one box, one wire, multiple access. The OB1 JCTD output will be formally evaluated and certified information security products pursuant to the combined DOD Intelligence Community Cross Domain Solution evaluation process managed by the Unified Cross Domain Management Office (UCDMO) and accredited for use in a broad spectrum of operational environments. The efficiencies include significantly reduced physical infrastructure (numbers of computers and network interface cards and wires), time and manpower savings in establishing mission networks, and savings in power, air conditioning, and other base/installation/office operating requirements. OB1 JCTD plans for a final demonstration and assessment in the fourth quarter of FY 2011. OB1 is a three year JCTD sponsored by USCENTCOM. *FY 2009 Plans:* Commence assurance evaluation. Commence network systems and security engineering and implementation planning with representative operational employment venues. Commence assessment and deployment planning. *FY 2010 Plans:* Commence certification processes leading to accreditation. Finalize military implementation and utility assessment plans. Conduct operational demonstrations of representative network environments.				
Mission Assurance Decision Support System (MADSS)	0.000	2.500	1.060	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Joint Requirements Oversight Council (JROC) validated the need for MADSS functionality for a FY 2009 new start. The MADSS JCTD will enhance correlation of data from different data sources by combining hardware and software using web-based services, secure network and automated data transformation services to provide integrated C3 Operational and critical infrastructure understanding. MADSS plans for a final demonstration and assessment in the third quarter of FY 2011, and transition to the NCES program of record in the fourth quarter of FY 2011. The expected output is a standardized framework and global capability for Commanders' C2-related anomaly response and execution, and defense support to civil authorities. The expected efficiencies are improved responsiveness and proactivity through integrated real-time communications anomaly data feeds, telecommunications infrastructure analysis and assessment data, and a mission area knowledge base for rapid event analysis and Warfighter course of action development. MADSS is a three year JCTD sponsored by USSTRATCOM. The Defense Information Systems Agency (DISA) is the lead agency. *FY 2009 Plans:* Refined operational user requirements for development of system architecture. Conducted limited functionality technology demonstration to refine specific functionality needed for mission thread assessment scenarios for the operational architecture. Efficiencies are expected from web-based community of interest (COI) specific access, COI mission area mapping, and automated data collection of DoD Information Technology (IT) infrastructure. *FY 2010 Plans:* Demonstrate militarily useful functionality in operationally relevant scenarios. Conduct operational utility assessment. Finalize documentation and transition functionality to a program of record.				
Joint Recovery and Distribution System (JRaDS) The Joint Requirements Oversight Council (JROC) validated the capability need for Joint Recovery and Distribution System (JRaDS) as a FY 2009 new start. The Joint Recovery and Distribution System (JRaDS) Joint Capability Technology Demonstration (JCTD) will develop and demonstrate the military utility of a new family of transportation trailers for the Department of Defense (DOD). JRaDS provides a Family of Systems (FoS) which enables execution of multiple mission profiles via a small number of trailer	0.000	5.700	4.500	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
variants versus the large inventory of distinct type trailer systems currently in the DOD trailer inventory. This FoS will offer high reliability and parts commonality and modularity in design thus reducing Service logistics and maintenance requirements and associated costs of ownership. Additionally, due to the semi-autonomous operating capability of JRaDS, semi-autonomous operating capability requirements for supplementary Material Handling Equipment (MHE) and supporting personnel may be reduced. These aspects will expedite cargo movement from Sea Ports of Debarkation (SPOD), Aerial Ports of Debarkation (APOD), and Theater Supply Depots to front-line users, while reducing costs associated with movement of cargo within theater. JRaDS will also afford an expeditious and efficient method of recovering disabled and catastrophically damaged Tactical Wheeled Vehicles (TWV) such as the Mine Resistant Ambush Protected Vehicles (MRAP) and light to medium weight Rotary Wing aircraft. The JCTD will also produce an Aircraft Interface Kit (AIK) that allows Army Container Roll-On Platforms (CROP) and Flat Racks to be expeditiously loaded into C-130 and C-17 cargo aircraft. The objective efficiencies to be gained are: JRaDS reduces the time, vehicle and manpower requirements for Tactical Wheeled Vehicle recovery by an estimated 50 percent. JRaDS will reduce MHE requirements by an estimated 20 percent during operations in an austere environment and improve theater cargo velocity by an estimated 20 percent. By having a standardized FoS trailer fleet that has common replacement parts, in-service effectiveness will improve by an estimated 20 percent and parts inventory and costs will be reduced by an estimated 50 percent. The transition strategy is to have Program Executive Office Combat Support/Combat Service Support (PEO CS/CSS) become the Joint Program Manager to procure and manage the supply of needed JRaDS trailers to the Services. Residual trailers from the JCTD will be used by field units thereby placing the JRaDS capability into forces sooner that waiting for production of trailers. The sponsoring Combatant Command (CoCom) is the U. S. Transportation Command (USTRANSCOM). The lead service is the Army. *FY 2009 Plans:* Develop Implementation Directive and Management Transition Plan; begin development of operational and system architecture; purchase first demonstration trailers and conduct technical demonstrations #1.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Conduct technical demonstrations #2 and #3; Complete final Joint Operational Utility Assessment (JOUA).				
Joint Medical Distance Support & Evacuation (JMDSE)	0.000	4.800	1.140	
The Joint Requirements Oversight Council (JROC) validated the capability need for JMDSE as a FY 2009 new start. The outcome of JMDSE will demonstrate capabilities mitigating problems associated with low density, high demand casualty evacuation forces; provide virtual/distant triage capability on a discontiguous battlefield; improve survivability and readiness of medical forces; and provide medical reach-back from first responder to forward resuscitative care facilities. The primary outputs to be demonstrated include battlefield telemedicine, precision aerial delivery of small quantities of critical medical supplies for casualties in hostile areas and aerial delivery of advanced litter technologies. The efficiencies to be gained include: less costly and more timely delivery of critical medical supplies and casualty care equipment; improved battlefield care of casualties; reduced risk to medical personnel on the battlefield or in manned aircraft delivering medical supplies. The transition strategy includes identification of precision small medical delivery systems, inclusion of telemedicine capability in theater-based programs of record, and battlefield casualty care advanced litter capabilities. The sponsoring combatant command is the Joint Forces Command with the executive agent being OSD Health Affairs.				
FY 2009 Plans: Implementation Directive, Management and Transition Plan, CONOPs, Integrated Assessment Plan, system and architecture design. First Operational demonstration				
FY 2010 Plans: CONOP refinement and operational demonstrations #1 and #2.				
Cooperative Security Engagement (CSE)	0.000	3.500	3.020	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Joint Requirements Oversight Council (JROC) validated the capability need for CSE as an FY 2009 new start. The outcome of CSE is to demonstrate operational concepts and tools for enabling joint, multi-national planning, coordination and synchronization. CSE will provide improved inter-agency adaptive planning process, regional/event based information sharing, integrated event assessment framework. The JCTD is a three year project under sponsorship of SOUTHCOM with EUCOM as a cosponsor. CSE will involve other U.S. Government agencies such as U.S. AID and Dept. of State, as well as non-governmental organizations and selected coalition countries. Transition strategy will incorporate CSE capabilities into cocom and stablitiy operations conops and policy. The primary outputs and efficiencies to be demonstrated in the JCTD Operational Utility Assessment are (1) interagency adaptive planning, (2) regional and inter-agency assessment. *FY 2009 Plans:* Complete implementation directive, integrate assessment plan; identification of planning, information sharing and assessment tools, initial operational concepts. Initial demonstration. *FY 2010 Plans:* Demonstration in operational context of tools and operational concepts with cooperative security community of interest in selected regions within SOUTHCOM and EUCOM areas of operations.				
Daily Watch The Joint Requirements Oversight Council (JROC) validated the capability need for Daily Watch as an FY 2009 new start. Classified content only. FY2009 new start, U.S. European Command is the lead CoCom. NRO is the lead agency. *FY 2009 Plans:* Classified content only *FY 2010 Plans:* Classified content only	0.000	2.800	4.500	
Precision Acquisition Weaponized System (PAWS)	0.000	4.400	4.500	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Joint Requirements Oversight Council (JROC) validated the capability need for PAWS as an FY 2009 new start. The PAWS JCTD will integrate multiple precision weapons aboard organic tactical ISR platforms, and demonstrate neutralization of threats. The weapon designs will allow multiple kills per sortie and engagement in environments where collateral damage and fratricide are unacceptable. This technology can solve current and significant shortfalls of organic ISR platforms for SOF that lack a kill mechanism with which to prosecute targets. These platforms can only relay target data to SOF on the ground, who must then engage the targets directly. In this process, the risk to SOF is increased greatly. PAWS will aleviate this risk. Deliverables will include documented Concept(s) of Operation , Tactics, Techniques, and Procedures, (software and hardware changes to demonstration platforms and weapons). Following the demonstration, fieldable prototypes will be made available to operational SOF units in their respective theaters. Tactical ISR system programs of record will make the changes necessary to incorporate this platform-independent technology. The Combatant Command/User Sponsor is the U.S. Special Operations Command and the Lead Service/Agency is the U.S. Special Operations Command. *FY 2009 Plans:* CONOP / TTP Development, Weapon Link Development, Safety Assessments, and Arming/Firing Development . *FY 2010 Plans:* Low Collateral Damage Testing, Certification, Integration with Host UAV, End-to-End Testing, and Demonstration #1 and Demonstration #2. Transition planning.				
Counter-Electronics High Powered Microwave System Advanced Missile Project (CHAMP)	0.000	5.800	5.000	
The Joint Requirements Oversight Council (JROC) validated the capability need for CHAMP as an FY 2009 new start. The outcome of CHAMP is to demonstrate and assess a multi-shot and multi-target aerial HPM platform that is capable of degrading, damaging, or destroying electronic systems. For this effort a compact HPM payload will be integrated into an appropriate aerial vehicle to create the aerial HPM platform demonstrator. CHAMP is a three-year project under sponsorship of United States Pacific Command (USPACOM), with completion of integration and final demonstration in FY 2012, and transition to an Air Combat Command program of record in POM FY 12-17. The lead service is Air Force. The				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
primary outputs and efficiencies to be demonstrated in the JCTD Military Utility Assessment (MUA) are: (1) Delivery of the HPM aerial system to the target; (2) Minimum effectiveness HPM range; (3) Stand-off distance from launch to target; (4) Multiple geographically separated targets; and (5) Navigation, orientation, and fuzing accuracy. *FY 2009 Plans:* Develop Implementation Directive and Management and Transition Plan. Conduct a Broad Area Announcement to identify potential industrial partners. Review analysis and solution alternatives. Conduct modeling and simulation and assemble test hardware components. The Air Force Research Laboratory, Directed Energy Directorate, High Power Microwave Division is the designated Technical Manager. *FY 2010 Plans:* Develop Concepts of Operations (CONOPs) and Tactics, Techniques, and Procedures (TTPs). USPACOM is the Operational Manager. Develop or refine training, test and security plans. Begin component systems integration and operator training. Conduct ground testing.				
Joint Multi-Effects Warhead System (JMEWS) The Joint Requirements Oversight Council (JROC) validated the capability need for JMEWS as an FY 2009 new start. The JMEWS JCTD will demonstrate an updated multi-effect warhead system aboard the Tomahawk Land Attack Missile (TLAM). This warhead technology will provide a leap-ahead capability against a widely varied target set, which includes hard and soft targets. In concert with this warhead, a Third-Party In-Flight Targeting (3PT) system will be demonstrated that will allow dynamic targeting and retasking of the missile as intelligence is updated. Using these technologies, Combatant Commanders will have the reliable option of neutralizing heavily defended and dynamic targets without the incursion of manned platforms. Hardware and software changes to the TLAM Program of Record (PMA-280) will be incorporated via Engineering Change Proposals once demonstrated. Deliverables will also include documented Concept(s) of Operation, Tactics, Techniques, and Procedures. Production of the TLAM will be shifted to replace the current warhead with the JMEWS warhead, and to add the datalink, radio equipment, and interfaces necessary for 3PT. JMEWS value to Joint Warfighter is it increases number of	0.000	0.000	3.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
targets held at risk and reduces cost; Increased flexibility in access denied environments; provides a long range, survivable, high-lethality weapon. The User Sponsor USSOCOM, USSTRATCOM and the Lead Service is the US Navy. *FY 2009 Plans:* Systems engineering, integration, & testing. *FY 2010 Plans:* Multiple targets demonstration, Validation, JMUA.				
Riverine & Intercoastal Operations (RIO) The Joint Requirements Oversight Council validated the capability need for RIO JCTD as an FY 2009 new start. The outcome of RIO is demonstration and transition of technologies and operational concepts for persistent situational awareness in the Intercoastal and Riverine areas. RIO will demonstrate the value of remotely monitoring maritime areas of interest with both interagency (DHS) and international (Colombia) partners as well as the U.S. Navy. RIO will enable situational and Maritime Domain Awareness through real time surveillance and advance reconnaissance of the riverine environment from a Mobile Operating Base (MOB), supporting the Battlespace Awareness and Force Protection capability areas. Persistent detection and monitoring of riverine activities will be accomplished through the use of networked Unattended Ground Sensors (UGS) and sensor data displayed in both the local and high-level Common Operational Pictures such as Global Command and Control – Maritime (GCCS-M). Local COP's display all remote detections as well as individual UGS control through wireless communications. RIO is a 2.5 year program with U.S. Southern Command as the operational manager, Naval Surface Warfare Center Dahlgren Division as the Technical Manager and Program Executive Office Littoral Mine Warfare – Antiterrorism/Force Protection (PMS-420) as the Transition Manager. The Naval Expeditionary Combat Command (NECC) and Naval Special Warfare community offer U.S. Navy support for RIO. Initial capabilities will be technically demonstrated in late FY 2009. The first operationally demonstrated capability will occur within the Continental US (CONUS) in FY 2010 and will focus on the Intercoastal element of RIO which is of interest to both the U.S. Navy and DHS. The Intercoastal spiral will conclude with a Limited Operational Utility Assessment. The second RIO spiral will focus on the riverine	0.000	2.800	2.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
environment and will be held outside CONUS (OCONUS) with Colombia in FY 2011. It will feature both a technical and operational demonstration OCONUS culminating with an Operational Utility Assessment. *FY 2008 Accomplishments:* . *FY 2009 Plans:* Begin RIO as a 'rolling start'. Define requirements and conceptual operations for both the US Navy and Colombia. Select and technically demonstrate baseline technology solution set (sensors, communications and COP). Draft and sign Master Information Exchange Agreement (MIEA) and other supporting agreements between U.S. and Colombia. Begin technical and system integration discussions with Colombia *FY 2010 Plans:* Integrate the unattended sensors, communications and common operational picture aboard a maritime mobile operating base. Technically and operationally test RIO in the Intercoastal environment. Formally test and document spiral capability through limited operational utility assessment. Spiral capability to both the U.S. Navy and DHS.				
Future Immersive Training Environment (FITE) The Joint Requirements Oversight Council (JROC) validated the requirements for the capabilities needed from FITE JCTD as an FY08 rolling start. The user sponsor and Operational Manager is USJFCOM. FITE JCTD will demonstrate advanced virtual training technologies for the small unit. It will provide a common software training environment for a variety of different training hardware configurations including laptop-based, Virtual Reality, Mixed Reality, and Augmented Reality. This two-year effort has been divided into two spiral demonstrations. The first spiral will demonstrate an individual worn Virtual Reality based on the hardware platform selected by the U.S. Army's Dismounted Soldier program. The second spiral will deliver advanced Mixed Reality technologies for fixed location training facilities such as the Marine Corps' Infantry Immersion Trainer (IIT) and the Army's Combined Arms Collective Training Facility (CACTF). In addition it will deliver an individual worn Augmented Reality	0.300	0.250	4.500	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
demonstration that will allow individuals to train small unit infantry skills at any location with special Augmented Reality equipment. This equipment will include a see-through Helmet Mounted Display that will project realistic looking virtual characters into the training environment. *FY 2008 Accomplishments:* Requirements Analysis began, Draft Implementation Directive created. *FY 2009 Plans:* Integrate FITE JCTD components into an individual worn squad level Immersive Virtual Environment. Operational Demonstration scheduled at Fort Benning, GA and Camp Lejeune, NC. Begin development of Spiral 2 demonstrations. *FY 2010 Plans:* Complete integration of Spiral 2 components: Facility Based Mixed Reality and Augmented Reality demonstration systems. Conduct Operational Demonstration in July 2010 at USMC and Army facilities TBD. Begin Transition of FITE JCTD capability to Programs of Record.				
National Senior Leadership Decision Support Service (NSLDSS) The Joint Requirements Oversight Council (JROC) validated the need for NSLDSS functionality for a FY 2008 new start. NSLDSS provides senior decision-makers a method for developing rapid situation awareness (SA) to support response planning and execution to time-critical events of national significance. Current processes rely heavily on teleconferences, resulting in much time spent on discovery, not decision-making. Information used to support decision-making is spread across the enterprise, not readily available in dynamic forms to distributed participants. NSLDSS is a combined hardware and software system consisting of DoD and commercial databases, search engines, source repositories, network enterprise services, policy decision services, enterprise universal data descriptor item, visualization tools, and web 2.0 capabilities. The user sponsor is the Joint Staff J3/NMCC and the Lead Agency is DISA.	0.600	2.000	2.500	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Initial Proof of Concept *FY 2009 Plans:* Spiral I – Improve Global Situational Awareness. Leverage existing tools to enhance Situational Awareness; JIEDDO (COIC); STRATCOM (NDMI); DIA (DIOCC); NORTHCOM (EMF); NCES (Collaboration, M2M, Security, Discovery; Search, etc); Identify and expose data sources supporting Mission Threads (C2BMC, ESSA, METOC, etc) . Mission Threads: Ballistic Missile Defense; Hurricane Threat; Mall of America; Hijacking of Airline; National Convention; Space Event. Technical Demonstration fourth quarter of FY 2009. *FY 2010 Plans:* Spiral 2 – Improve Course of Action Options and Decision Making; Demonstrations and Limited Operational Utility Assessment (LOUA)				

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C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
Line Item #48/ PE 0603750D8Z/ACTD	1.552								Continuing	Continuing
Line Item #96/ PE 0604648D8Z/JCTD Transition	2.866	13.487	18.816						Continuing	Continuing

D. Acquisition Strategy

The strategy for JCTDs has always been to rapidly develop technologies, conops and TTPs that answer a validated joint/coalition warfighter need and provide a transition path into an existing program of record or to establish a new program for those projects that show significant military utility in the demonstration phase. The following questions are used for the selection of compelling JCTD capability projects:
- Does the action address CoComs needs?
- Is a Joint capability or military advantage gained?
- Do we have a clearly stated and attainable goal?
- Have risks and costs been fully and frankly analyzed?
- Have all other DOTMLPF means been fully explored?
- Is there an exit strategy to avoid endless development?
- Have consequences of inaction been fully considered?
- Can genuine support be garnered from interested partners?
- Are experienced people available to execute the effort?
- Can results be demonstrated to the project champion?

Under the new JCTD program, only the JCTDs that demonstrate the highest military utility will be considered for the transition funding in the JCTD BA4 Transition PE. Many JCTDs will transition smoothly into a well identified program of record and not require funding from the transition PE (the transition arm of the JCTD model). Promising ongoing ACTDs may also receive transition funding from the JCTD Transition arm as the remaining few ACTD projects complete. Some initiatives that are successful but have smaller "sustainment of residual capabilities" issues may receive "pre-transition" funding from the JCTD BA3 PE to aid transitioning the capability to an identified program of record or to the warfighter. JCTD metrics and guidelines are:

- Capability Based: Greater CoCom influence looking at nearer term joint/coalition needs.

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- Provide Spiral Technologies - 25 percent will provide an operationally relevant product demonstration within 24 months of Implementation Directive (ID) signature.
- Agile Demonstration - 75 percent complete final demonstration within three years of ID signature.
- JCTDs not necessarily tied to an exercise. Greater flexibility to establish military utility via operational "real-world" demonstration or specifically designed test/venue.
- 80 percent of JCTDs transition at least 50 percent of their products to sustainment.

E. Performance Metrics

Strategic Goals Supported FY 2008:
- Project Selection Focus
- Spiral Technologies
- Time to Final Demonstration
- Adequately Shared Funding and Visibility
- 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. DUSD(AS&C) maintains and provides overall programmatic oversight for the JCTD program, to include the individual JCTD projects. The JCTD performance metrics center on how fast relevant joint and/or transformational technologies can be demonstrated and provided to the joint warfighter. These metrics are driven by the overall business process which includes six parts: (1) selection focus; (2) ability to spin-off spiral technologies; (3) time necessary to complete a final demonstration; (4) adequately resourced projects with appropriate oversight; (5) capability to complete an independent assessment of the technology; and (6) the number of successful capabilities that are actually transitioned to the warfighter. The table below defines the metrics of the JCTD business process model.

1) Project Selection Focus: Capability Based: Greater Combatant Command (CoCom) influence looking at nearer term joint/coalition needs.
2) Spiral Technologies: 25 percent of JCTDs will provide an operationally relevant product demonstration within 24 months of ID signature.
3) Final Demonstration Completed: 75 percent of JCTD projects will complete final demonstration within 3 years of ID signature.
4) Shared Funding and Viability of resources: OSD provides significantly more funding than the former ACTD program, greater than 30 percent in some cases; a majority of projected funding, especially in the first two years.
5) Complete independent assessment.
6) Number of capabilities transitioned to the warfighter.

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603662D8Z Networked Communications Capability

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	29.068	29.759	28.212						Continuing	Continuing
P662: Airborne Network Gateway	3.101	14.880	8.756						Continuing	Continuing
P663: Network Communications Analysis	25.967	14.879	19.456						Continuing	Continuing

A. Mission Description and Budget Item Justification

Warfighters today rely more and more on communications networks to support and enable actions from targeting and shooting weapons to video-conferencing. Though military basic infrastructure capabilities follow the mainstream commercial internet, for many reasons (security, mobility, robustness), commercial telecommunications especially commercial wireless (tactical edge) communications are not well-matched with the requirements of today's warfighter. These trends will continue as the military data load becomes more diverse and heavy. The National Research Council's Network Science Report (2005) and Army Mobile Ad-hoc Network (MANET) JASONS Report (January 2006) state that the type of networking projected to meet military tactical requirements is not supported by network theory, network design nor analysis tools. These tactical edge technology challenges cut across all warfare domains (space, air, ground, sea). In response to recognized technical problems today, as well as anticipated problems in the future, this research will focus on two key problems in networked technologies: the need for expanded wireless reach where no communications infrastructure exists, and the need to create ways to manage diverse wireless communications load and heterogeneous network types. Airborne Network Gateway will expand the wireless communications and networking reach for the tactical force in the form of an airborne network gateway capability. Network Communications Analysis will establish the scientific foundations for military tactical mobile networking with a specific emphasis on the integrated network management of tactical networks. This research will provide the technical basis to standardize the implementation of military network communications capabilities in the areas of airborne network gateways and network communications analysis across the military services, joint staff, OSD, and defense agencies.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	14.871	39.923	28.727	
Current BES/President's Budget	29.068	29.759	28.212	
Total Adjustments	14.197	-10.164	-0.515	
Congressional Program Reductions		-10.000		
Congressional Rescissions		-0.164		
Total Congressional Increases				
Total Reprogrammings	14.426			
SBIR/STTR Transfer	-0.229			
Other			-0.515	

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P662: Airborne Network Gateway	3.101	14.880	8.756						Continuing	Continuing

A. Mission Description and Budget Item Justification

Airborne Tactical Relay - An airborne tactical relay capability enables Beyond Line of Sight (BLOS) range extension for tactical mobile communications. Within the current deployed forces there is no airborne network tier to support locally distributed ground and naval forces at lower tactical levels. The need to increase the capability to support tactical forces at lower levels is highlighted in the 2006 Naval Research Advisory Committee (NRAC) Distributed Operations Study. The current lack of an airborne tactical relay limits BLOS tactical communications to available satellite communications. This research will develop, integrate and demonstrate airborne tactical relay technology to support locally distributed tactical forces and achieve improved near-term networked communications capability. Focus will be placed on the transition from research to acquisition for accelerated fielding. Several candidate payloads and platforms will be investigated to meet the needs of the tactical military user at the lower tactical network tiers, for example, small unit relay. Upon the selection of candidates, the technologies will be integrated, matured and demonstrated to support transition. Research and development will include the development and integration of the payload to include Single Channel Ground and Airborne Radio System (SINCGARS), Enhanced Position Location and Reporting (EPLRS), and Soldier Radio Waveform (SRW) for example; the payload to platform integration to support demonstration; and the development of a small unit Concept of Operations (CONOPS) to demonstrate operations supported by the range extension for tactical units. Demonstrations will be used to support technology maturation and verify technology transition criteria.

Airborne Network Gateway - An airborne network gateway interconnects dissimilar networks among tactical forces and also interconnects tactical forces with higher headquarters and command centers. In general, gateways interconnect networks with different, incompatible communications protocols. Gateways are commonly used commercially in the wired internet world to bridge between different networks. The Department of Defense (US Air Force) has initiated a program, Objective Gateway, to develop a family of modular, scalable airborne and ground-based gateways based on the reduction/demonstration efforts, Battlefield Airborne Communications Node (BACN) and Rapid Attack Information Dissemination Execution Relay (RAIDER). As an airborne network gateway, the Objective Gateway program will bridge between disparate data links and voice networks, integrate sensors into the network and provide Internet Protocol (IP) connectivity to the tactical edge. The Airborne Network Gateway research will develop, integrate and demonstrate airborne network gateway technology to facilitate near term networked communications capability that will be transitioned to the Objective Gateway program. Specifically, this research will investigate the data links (eg. Link-16, 1553), networks (eg. Tactical Targeting Network Technology (TTNT)), and voice (eg. cellular) candidates for an airborne network gateway, assess technology issues and maturity, and develop enhancements that will overcome shortfalls that preclude the ability to more broadly network the force through an airborne network gateway. One specific area of emphasis will be the analysis of the airborne network gateway effectiveness across sensor to weapon scenarios. Demonstrations will be used to support technology maturation and verify technology transition criteria.

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Gateway Interoperability - As discussed above, the Objective Gateway program will develop a family of modular, scalable airborne and ground-based gateways. Additionally, there will be gateway functions performed by other components within the network. Gateways as a general term include relays (range extension), bridges (connect across networks), message translation (connect across data links), and guards/cross domain security (connect across security domains). This research will define, develop, integrate, demonstrate, and assess technologies that provide standards to perform gateway functions from the tactical edge to the core Global Information Grid network (GIG). Many technologies and components exist to perform the variety of gateway functions discussed. These would be assessed to identify desirable aspects to be leveraged as the foundation for providing improved interoperability. Emphasis will be placed on demonstrating capabilities to support airborne tactical relays and airborne network gateways. The research will be expanded to provide the technical basis for standards and policies that can be applied across DoD, specifically in support of the GIG.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Airborne Network Gateway	0.701	4.095	0.356	
Current program plan calls for the development and demonstration of Concurrent Multinetting to enhance Link-16 and enable multiple networks to operate concurrently and interoperate on a single platform. In addition, other enhancements will be evaluated for enhancing Link-16 and enabling interoperability between IP-type networks and Link-16. These enhancements will be developed during CY 2008-2010 by the Navy (SPAWAR Systems Center) in collaboration with the Air Force (Langley), with a target transition to the Navy Joint Tactical Information Distribution System (JTIDS) and the Multi-functional Information Distribution System-Low Volumn Terminal (MIDS-LVT) program offices along with the Air Force (Langley) in 2011. These enhancements will be offered to international partners to enable interoperation with joint and coalition communications networks. Current plan also calls for the development of further enhanced gateway capability with additional tactical networks in 2009 to be executed by the Navy, Air Force and Army to develop and build the technologies necessary for a joint gateway that will interconnect diverse tactical networks. Overall goal: Evaluation of the technologicaly matured data link, networks, and voice capabilities to be integrated into a form factor with size, weight, and power design constraints. Development of enhancements to improve networking across the battlespace. Incorporation of standards that will lead to improved interoperability. Increased understanding of the operational concepts that will use this integrated capability.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Link-16 gateway enhancements for evaluation and selection. Plans called for the assessment of technical maturity of data link, network and voice communications capability to be used for airborne network gateway candidates. Initiated the development of enhancements to support shortfalls discovered. Initiated the development of technology transition criteria. *FY 2009 Plans:* Conduct operational demonstration of enhancements developed for the airborne network gateway capability. Select new candidates for gateway development and integration. Initiate research to support airborne gateway for specific existing tactical communications networks. Assess technical maturity of candidates. Conduct military utility assessment. Continue development for follow on assessment and technology maturation. *FY 2010 Plans:* Complete selection and demonstration of technologies. Transition to the JTIDs, MIDS-LVT and MIDS-Joint Tactical Radio System (JTRS) programs.				
Airborne Tactical Relay Current program plan calls for the development and maturation of an airborne communications relay suitable for flight on a UAV. The relay will be demonstrated in an operational environment by the end of 2009 and transitioned in 2010. The first year's effort will be executed by the Marine Corps (Office of Naval Research) and the second year's effort will be executed by the Marine Corps (Office of Naval Research) and Army (Communications-Electronics Research, Development, and Engineering Center). Plans call for a common, joint airborne relay supporting tactical small units developed jointly by the Marine Corps and Army, to include development of the payloads and concepts of operation and transition directly to the Services. Overall goal: Increase the understanding of airborne tactical relays. Demonstrate the network communication technology required to support small unit distributed operations. Establish the concept of operations for how these technologies will be operationally used and supported.	2.400	6.289	2.400	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603662D8Z Networked Communications Capability	**PROJECT NUMBER** P662

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Platforms and payloads selected. Developed, integrated and tested the payloads; procured (leased) platforms (UAV, ground terminals and portable equipment); completed payload to platform integration for operational demonstration. Established the concept of operations and operational scenario. Conducted the military utility assessment. Initiated technology transition criteria. *FY 2009 Plans:* Procure (buy) platforms; Develop additional concepts of operation and conduct military utility assessment. Assess technology maturity and validate technology transition criteria. Continue the development for follow on assessment and technology maturation. Investigate usage of different payloads. *FY 2010 Plans:* Complete demonstration of operational relay capability. Transition to Marine and Army Partners				
Gateway Interoperability Current plan calls for initiation of this project in 2009 as a joint Navy-Marine Corps-Army-Air Force effort. Increase understanding of gateways, a complex area of networking within DoD. Establish the technical basis for DoD policy and standards for the Global Information Grid (GiG), specifically in the area of the tactical edge attachment to the GIG core networks. *FY 2009 Plans:* Evaluate gateway technologies and program candidates. Define the criteria for acceptable gateway technical and operational performance criteria. Initiate the integration of gateway candidates for testing and assessment. Produce initial technical report for gateway standardization and interoperability. Initiate the development of technology to fill shortfalls for airborne tactical relay and airborne network gateway. Complete gateway testing and assessment. *FY 2010 Plans:* Build prototype gateway for Army and Marine Networks. Transition to programs of record.	0.000	4.496	6.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603662D8Z Networked Communications Capability	**PROJECT NUMBER** P662

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Strategic Goals Supported: Net-Centric Warfare/Joint Interoperable Communication

Existing Baseline:Prototype relays and gateways; initial federated, laboratory test beds; prototype joint network management tools

Planned Performance Improvement / Requirement Goal: Link expansion in prototype relays and gateways; Continued integration in federated test beds; demonstration of prototypes and software tools

Actual Performance Improvement: Prototype and transition able relays and gateways; Usage federated test beds; demonstration of prototypes and software tools

Planned Performance Metric / Methods of Measurement : Utilization of federated test beds; demonstration of prototypes and software tools

Actual Performance Metric / Methods of Measurement : Progress on testbed development; prototype software demonstrated; prototype architectures developed

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603662D8Z Networked Communications Capability					**PROJECT NUMBER** P663	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P663: Network Communications Analysis	25.967	14.879	19.456						Continuing	Continuing

A. Mission Description and Budget Item Justification

Tactical Mobile Networking - As studies have suggested, for instance, the National Research Council's Network Science Report (2005) and Army Mobile Ad-hoc Network (MANET) JASONS Report (January 2006), the type of networking projected to meet military tactical requirements are not supported by network theory, network design and analysis tools. This research will define those technical parameters important to military tactical mobile networking environments, investigate the status of network design and analysis tools, and evaluate how modeling and simulation is conducted to support tactical mobile networking environments. The role of network experimentation with respect to network modeling will be explored. Further development and analysis will be conducted to improve the awareness of the condition of tactical mobile networking technologies. Design tools, architectures and technical approaches will be recommended to acquisition programs as a result of this research.

Network Management Tools and Analysis - Network management in the commercial world is a highly organized, synchronized activity that has excellent tools to monitor activity and repair disrupted networks as needed. These same tools are ill-matched for management in the wireless world, and specifically for military tactical mobile networking. In addition, the military tactical mobile networking environment lacks the infrastructure (connectivity) and support (helpdesk) because resources (spectrum, people, equipment) are scarce (not in harms way). As the complexity of networking grows and as network capabilities are introduced, improved network management is required. For military operations, assured delivery may be needed for specific information and operations. This requires management tools to be in place to ensure continued secure and robust operations, which is not achieved with commercial wireless technologies. This research will assess network management tools in place for the military tactical mobile networking environment; develop technology and tools to address shortfalls with the goal to transition technology to operational systems.

Spectrum Management Tools and Analysis - For wireless, tactical mobile networking, spectrum management affects network operations. The demand for spectrum is increasing due to the expanded use of sensors, imagery and voice. This demand increases the pressure on the limited shared radio frequency (RF) spectrum for military tactical networking. The current DoD frequency planning and management infrastructure will have a limited ability to cope with this demand through operational planning, Coalition Joint Spectrum Management Planning Tool (CJSMPT) Joint Capability Technology Demonstration (JCTD) and the Global Electromagnetic Spectrum Information System (GEMSIS). Advanced spectrum management concepts such as sense and adapt, spectrum sharing, and dynamic reallocation are under investigation but not yet mature enough to support operations. This research will evaluate opportunities for more efficient and effective use of the frequency spectrum within DoD. Technology advances are expected to advance the concept of cognitive radio and cognitive antenna devices to sense and adapt operations based on spectrum policy and usage, the management of multi-band and multifunction apertures, and the use of spectrum efficient waveforms for use in military environments. This research will develop the models and tools to demonstrate capabilities for operational planning and monitoring of spectrum as these technologies are introduced.

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Integrated Network Management Capability - Network management becomes more complex as more and different types of networking capability become available. Integrated network management across heterogeneous systems, especially wireless systems, requires definition, design and development. Operationally, network management assumes all functions required to share networking resources and ensure proper operation for participants. This research will define integrated network operations tools for all aspects of network resource management and to prioritize across operational spectrum management, security management, network management, and information management. This research will also develop testbeds specially to validate models and simulations used to develop and test network management tools, and conduct experimentation on approaches developed.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Integrated Network Management Capability	4.484	4.056	5.031	
This project is for the development of joint integrated network management tools, and three federated experimental test beds for the development and evaluation of integrated tactical network management and spectrum management. Project executed jointly by the Navy, Army and Air Force. Plans also establish a Joint Network Operations (NETOPS) Integrated Collaborative Working Group for the establishments of standards and joint development in support of all projects in this program. Membership includes the research community from the Navy, Marine Corps, Army and Air Force as well as developers from acquisition programs such as Future Combat Systems (FCS), Warfighter Information Network-Tectical (WIN-T) and Joint Tactical Radio Systems (JTRS). Future plans call for further joint infrastructure test bed development to include DoD PlanetLab as well as joint networking tools in support of NETOPS. The results of this research will transition to future increments of JTRS and WIN-T, and if successful, to the field through a joint integrated tactical NETOPS program. Overall goal: Common integrating framework to support interoperability among various aspect of developmental network operations and management to include: spectrum management, network management, security management and information management. Reduce the cost to develop, procure and support networks through the integration across networks and functions within networks. . *FY 2008 Accomplishments:* Interface Control Working Group was established. Established federated testbeds at Army, Navy and Air Force research facilities to explore how individual network management tools work together in				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
diverse tactical networks. Initiated development of integrated management tools. Established network management data library. *FY 2009 Plans:* Complete joint federated test beds and transition test beds to Services, initiate DoD PlanetLab test and development facility. Continue the definition of an integrated network management framework. Demonstrate tools that provide integrated network management. Work to increase participation (submission and usage) of network management data library. *FY 2010 Plans:* Demonstrate tools in an operational environment, transition tool set. Initiate selection and evaluation of next generation integrated network management software tools.				
Network Management Tools and Analysis This project is for the development of joint standards and tools for policy-based and measurement-based tactical network management. New standards and applications will be tested in a joint federated experimental emulation test bed being developed within this program. Project jointly executed by the Navy, Air Force and Army, with technology transition agreements being pursued with programs of record. Overall goal: Increase understanding of the complexity of tactical network management. Determination of the support required for tactical network operations. Evaluation of technology to support transition and fielding to operational capability. *FY 2008 Accomplishments:* Air Force and Army evaluated jointly selected policy-based Network Management tools. Measurement-based tactical network management tools developed by the Navy. Shared results and tools in a collaborative environment (called the Joint NETOPS Integrated Collaborative Working Group). Assessed network management tools for the military tactical mobile networking environment in operational and laboratory testbed environments.	2.666	4.145	5.259	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Further develop and demonstrate management tools to evaluate technical maturity and military utility. Initiate technology transition planning. Plan to expand testing of Navy network managmenet tools to tactical scenarios. Continue to conduct validation of tools in testbed facilities.. *FY 2010 Plans:* Transition tools to existing programs; Initiate selection and evaluation of next generation Network Management tool set.				
Spectrum Management Tools and Analysis This project is for the development of measurement-based spectrum management tools. Applications will be developed and tested in a laboratory environment. Project executed by the Army with results available to the Navy and Air Force through the Joint NETOPS Integrated Collaborative Working Group. Transition planned for the GEMSIS program in 2010-2011 as maturity allows, and to other existing tactical network programs as appropriate. Overall goal: Technical basis to support changes regarding the operational use of spectrum both within the military and among spectrum regulatory bodies. *FY 2008 Accomplishments:* Developed the spectrum technology strategy for the introduction of advanced capability beyond operational mission planning. Demonstrated technologies to support monitoring and planned adjustments as spectrum conditions allow (Dynamic Spectrum Access Capabilities). Assessed emerging spectrum technologies for inclusion to support military operations. Developed dynamic spectrum access (DSA) architecture. *FY 2009 Plans:* Expand program into spectrum-aware, cognitive networking (antenna and radio capabilities) for existing tactical networks. Demonstrate concepts and technologies to support a more efficient and effective use of spectrum. Initiate collaborative research among the Services. Investigate transition areas.	1.543	2.973	4.538	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Demonstrate and transition technologies for spectrum management. Initiate identification and evaluation of next generation Spectrum Management tool set.				
Tactical Mobile Networking	1.761	3.705	4.628	
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 being 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. Overall goal: Increase understanding of the condition of tactical mobile networking technologies. Improve specification of technical standards and policy for tactical mobile networking. Finer fidelity modeling and simulation to support operations analysis and the articulation of operational requirements and performance parameters. *FY 2008 Accomplishments:* Work was executed by the Navy and Air Force. Completed initial analysis of the technical parameters to be met for tactical mobile networking. Evaluated modeling and simulation along with design and analysis tools to support tactical mobile networking. Initiated the development of an improved set of tools to support tactical mobile networking and evaluate tools in an experimental setting. *FY 2009 Plans:* Initiate research into other areas applicable to the joint tactical environment such as cognitive networking. Continue the development of an improved set of tools. Develop testbeds and demonstrate tools in a laboratory testbed environment. Explore areas for cross-service collaboration. Explore transition opportunities for tool set.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Continue work in cognitive networking, demonstrate architectures and tools in testbeds and operational evaluations.				
Netted Iridium Deliver an Over-the Horizon (OTH), on-the-move, Beyond-Line-of-Sight (BLOS) communications and network management capability to disadvantaged users operating in overseas combat areas. Productize the experimental Nettted Iridium (NI) radio capability in order to provide OTH and BLOS to the CENTCOM Area of Responsibility. *FY 2008 Accomplishments:* Completed basic (radio only) and advanced models of the NI radio. Conducted several user assessments to demonstrate the NI capability.	15.513	0.000	0.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Strategic Goals Supported: Net-Centric Warfare/Joint Interoperable Communication

Existing Baseline:Prototype relays and gateways; initial federated, laboratory test beds; prototype joint network management tools

Planned Performance Improvement / Requirement Goal: Link expansion in prototype relays and gateways; Continued integration in federated test beds; demonstration of prototypes and software tools

Actual Performance Improvement: Prototype and transition able relays and gateways; Usage federated test beds; demonstration of prototypes and software tools

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Planned Performance Metric / Methods of Measurement : Utilization of federated test beds; demonstration of prototypes and software tools

Actual Performance Metric / Methods of Measurement : Progress on testbed development; prototype software demonstrated; prototype architectures developed

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603663D8Z Joint Data Managment Advanced Development

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	4.935						Continuing	Continuing
P366: Joint Data Management Advanced Development	0.000	0.000	4.935						Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new start program.

(U) As the Department of Defense increases the capability and capacity to generate increasing amounts of data from numerous sensors in the battlespace, the issue of handling very large data sets has become more challenging. This is in part due to Department of Defense response to a changing threat environment where there is an expansion of the types of sensors deployed, new types of information collected, and different features used to classify these new threats. From a technical perspective, sensor processing speeds have outpaced the speed and ability to transport, store and process the data created. Science and technology investigation into new and novel ways to manage and exploit this data is required to more efficiently use sensor assets and effectively use information in a timely fashion.

This program will establish the demonstration and experimentation environment to conduct independent evaluations of research efforts that have the most potential of minimizing the impact of the increasing amount of information required within military operational decision-making. The intent is to leverage existing research investments within defense Science & Technology and provide proper evaluations and assessments to facilitate technology transition. These objective assessments will be conducted and coordinated across the defense research base and with other parts of government to include Director, National Intelligence and Department of Homeland Secutity.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603663D8Z Joint Data Managment Advanced Development

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	0.000	0.000	0.000	
Current BES/President's Budget			4.935	
Total Adjustments			4.935	
Congressional Program Reductions				
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer				
New Program			5.000	
Other			-0.065	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603663D8Z Joint Data Managment Advanced Development					**PROJECT NUMBER** P366	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P366: Joint Data Management Advanced Development	0.000	0.000	4.935						Continuing	Continuing

A. Mission Description and Budget Item Justification

This is a new start program.

(U) As the Department of Defense increases the capability and capacity to generate increasing amounts of data from numerous sensors in the battlespace, the issue of handling very large data sets has become more challenging. This is in part due to Department of Defense response to a changing threat environment where there is an expansion of the types of sensors deployed, new types of information collected, and different features used to classify these new threats. From a technical perspective, sensor processing speeds have outpaced the speed and ability to transport, store and process the data created. Science and technology investigation into new and novel ways to manage and exploit this data is required to more efficiently use sensor assets and effectively use information in a timely fashion.

This advanced technology demonstration program will establish the demonstration and experimentation environment to conduct independent evaluations of research efforts that have the most potential of minimizing the impact of the increasing amount of information required within military operational decision-making. The intent is to leverage existing research investments within defense Science & Technology and provide proper evaluations and assessments to facilitate technology transition. These objective assessments will be conducted and coordinated across the defense research base and with other parts of government to include Director, National Intelligence and Department of Homeland Security.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Novel Information Architectures	0.000	0.000	1.470	
(U) Both the size of the data to be transferred and the growing size of databases require novel architectural approaches to provide the adaptability and usability. Current databases, file systems and network protocols will not keep pace. Additionally, the level of automation required will necessarily impact the expectation of man/machine interaction and their performance. Research areas to be explored may include reconfigurable, scalable, and dynamic systems; re/indexing, association, and ontological representation for distributed and streaming data; many core file and operating systems, management and				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
scheduling, and optimized algorithms; operationally relevant metrics and figures of merit for architecture performance, security, and vulnerability. Program Outputs and Efficiencies – (U) Improved knowledge regarding system and network component performance which can be leveraged across Defense S&T and development communities. *FY 2010 Plans:* (U) Initiate research activities in candidate areas. Establish assessment methods of candidate approaches. Evaluate candidates for inclusion in experimentation and demonstration.				
Experimentation and Demonstration Program Examine relevant DoD problem domains such as Wide Area Surveillance and Biometrics where recommended research solutions for handling large data can have the most impact. In order to conduct experimentation and assessments, test data sets and methodologies will be collected and developed. Assessment methods and performance metrics will be used to compare research options and solution potential. Several factors will be considered during these evaluations, such as; the basis of making a decision or taking an action; how access to this data has operational impact; make a difference, can the data feature be detected and processed (e.g. extracted) from the large data setand can the data be accessed and processed to support the decision, action or analysis. Program Outputs and Efficiencies – (U) Data to support potential solutions for handling large amounts of data. *FY 2010 Plans:* (U) Collect data sets used for experimentation. Plan and conduct experiment and demonstration event in one problem domain. Evaluate results.	0.000	0.000	3.465	

C. Other Program Funding Summary ($ in Millions)

N/A

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D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	9.838	10.521	10.993						Continuing	Continuing
P665: Biometrics Science and Technology	9.838	10.521	10.993						Continuing	Continuing

A. Mission Description and Budget Item Justification

In Oct 2006, the Deputy Secretary of Defense designated the Director for Defense Research and Engineering (DDR&E) as Principal Staff Assistant (PSA) for biometrics with the responsibility to fully address and exercise control over all facets of the Department's biometrics programs, initiatives, and technologies. Biometrics technologies have the unique potential to provide the Department with the capability to take away an adversary's anonymity; this program provides focused investment to fill current technology gaps.

Biometrics technologies can be used to both verify an individual's claimed identity and, when combined with additional intelligence and/or forensic information, biometrics technologies can establish an unknown individual's identity, thus stripping away his anonymity. The biometrics science and technology program addresses the technology gaps that preclude our ability to quickly and accurately identify anonymous individuals who threaten our interests, in whatever domain they operate.

This program develops a comprehensive biometrics science and technology plan and implements multiple projects to advance capability to identify anonymous individuals using individual biometrics.

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	10.113	10.579	11.194	
Current BES/President's Budget	9.838	10.521	10.993	
Total Adjustments	-0.275	-0.058	-0.201	
Congressional Program Reductions				
Congressional Rescissions		-0.058		
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.255			
Other	-0.020		-0.201	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology					**PROJECT NUMBER** P665	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P665: Biometrics Science and Technology	9.838	10.521	10.993						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program will develop the technology that will improve the quality of biometrics derived information provided to the operational forces for the purpose of identifying and classifying anonymous individuals. It will enable execution of a DoD and interagency coordinated biometrics science and technology plan that supports technology transition to acquisition programs in FY10 and the out-years.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Biometrics S&T Planning	0.575	0.750	0.500	

A comprehensive Biometrics Science and Technology (S&T) Strategic Plan was developed and will be continually refined to guide component level investment in biometrics technology.

FY 2008 Accomplishments:
Established baseline of technology and developed near term S&T objectives. Completed a comprehensive S&T strategy to coordinate the biometrics investment within the Department. Leveraged membership in the Center for Identity Technology Research (CITeR) to support research in priority biometrics areas relevant to DoD. Prepared assessment of biometrics capability areas to support initiation of biometrics acquisition programs of record in FY 2010. Developed a detailed biometrics process modeling and simulation tool to assess and guide investment decisions.

FY 2009 Plans:
Completed Biometrics S&T plan and roadmap to guide component biometrics S&T investments. Developed beta version of a biometrics “dashboard” to assess performance metrics and return on investment. The S&T roadmap was developed in consideration of the recently completed Joint Staff Biometrics Capability Based Assessment (CBA) which is part of the process of defining formal biometrics requirements.

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Continued maintenance of the Biometrics S&T roadmap to incorporate emerging technologies and evolving capability requirements and gaps. Transition the biometrics "dashboard" to the Executive Agent (Army) for continued refinement and maintenance.				
Biometrics Technology Projects Biometrics capabilities and gaps are continually evaluated though the planning process addressed above and those gaps will be addressed through the competitive solicitation of focused proposals. Broad Agency Announcements (BAA), technical proposal reviews, selections and awards will recur annually. *FY 2008 Accomplishments:* Completed technology gap analysis and issued a BAA soliciting proposals to the full range of biometrics capabilities. Reviewed 175 proposals and selected 10 projects for funding. As of 12 Dec 08, awarded contracts on 9 of the 10 projects. Projects range from $0.165 to $0.750 million and are of 6-12 months in duration. High Throughput Rapidly Deployable Iris Biometric Capture System: Delivered prototype designed to demonstrate a low cost, light weight, high speed iris image capture using a single camera in a portal environment. Multispectral Iris Fusion for Enhancement and Interoperability: Developed and demonstrated a capability to match iris images taken in the near infrared spectrum with images taken in the visible light spectrum using data fusion techniques at the pixel and feature levels to increase matching accuracy and enrollment performance. Acquiring High-Quality Iris Images from Moving Subjects with a Fluttering Shutter: Developed and demonstrated a fluttering shutter technology to enable the capture of high quality iris images in the presence of camera or subject motion and demonstrate the compatibility of the image with existing iris matching algorithms.	5.563	7.000	7.155	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology	**PROJECT NUMBER** P665

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
A Daytime/Nighttime Long Range Multi-biometric System for Military Operations: Development and delivery of a 5 beam BioLidar prototype capable of capturing 3-D facial images from moving subjects out to 50 meters and facial recognition software capable of working with both 3-D and 2-D databases. Development of an Advanced Hand-held Iris Biometric Imager Brassboard and Demonstration: Developed and delivered of a functional brassboard based on adaptive optics for handheld simultaneous capture of face and iris images in less than one second. Miniature, non-contact, rolled equivalent fingerprint collection device: Delivered a prototype to demonstrate a non-contact, nail-to-nail fingerprint scanner that can capture a 3-D fingerprint image quickly accurately and independent of an operator. Face Recognition for Physical and Logical Access Control: Developed a robust accurate and cost effective 3-D/2-D face recognition algorithm that combines 2-D images obtained using COTS 2-D cameras with 3-D data obtained from dedicated enrollment stations to rapidly identify subjects. and information Demonstration and Assessment Novel Long Range Illuminator: Designed and demonstrated an illuminator based on super luminescent LEDs capable of capturing an Iris image to standard at 50 meters. Finger, Face, and Iris Biometric Fusion Technology Demonstration for DoD Applications: Demonstrated on a field deployable portable computing platform of score-based fusion algorithms for face, iris and fingerprint data using both quality and match scores. Rugged Field Portable Fingerprint Workstation: Developed and delivered a low-cost, rugged, field-portable, fingerprint workstation combining commercial optics, electronics, hardware and software for field use.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology	**PROJECT NUMBER** P665

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Comple multiple demonstrations of various technologies to improve the standoff collection, quality and matching accuracy of facial and iris images. Results provided to Army to inform the development of their FY 2010 new start acquisition program for tactical biometrics collection devices. As a follow-up to the FY 2008 BAA, solicited focused proposals to develop innovative means to capture fingerprint, face and iris images in all conditions with a single sensor, and to demonstrate the Ability to leverage matching across multiple modalities. *FY 2010 Plans:* Continue to review the results of technology demonstrations and focus technology development solicitations on achieving technology readiness levels needed to transition to FY 2010 new start programs of record.				
Forensics Commercially available forensics technologies have been developed for use in permissive law enforcement operations and fixed site laboratories. DoD has a requirement to collect, preserve, exploit and analyze forensics materials from site exploitations in forward deployed expeditionary operations and with field hardened equipment suitable for use by military personnel. The forensics projects under this program will develop expeditionary forensic collection, processing and exploitation systems capable of operating in all tactical environments. *FY 2008 Accomplishments:* Initiated forensics S&T planning to include the first DoD wide and interagency forensics S&T conference. Assessed current state of forensics technologies, identified gaps and initiated comprehensive forensics S&T strategy for delivery in the first quarter of FY 2009. *FY 2009 Plans:* Completed development of a forensics S&T strategy and solicited focused proposals consistent with identified gaps. Leveraged forensics technology development efforts of other US government activities	0.500	2.771	3.338	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
to include DHS, FBI and the National Institute of Justice. Initial investments focused on technologies that enhance latent print collection and examination in tactical environments, materials and ballistics examination, and forensics reach-back support to fully capable laboratories and forensics experts. Additionally, co-sponsored a field-deployable rapid DNA profiling system using advanced micro-fluidic technologies to demonstrate accelerated DNA sequencing and matching in a field deployable system. *FY 2010 Plans:* Continued to review the results of technology demonstrations and focus technology development solicitations on achieving improved technology readiness levels for expeditionary forensics capabilities.				
Variable Distance Iris Identification on the Move (Congressional Add) The DOD Biometric Fusion Center has a requirement to develop a stand-off biometric (iris) collection capability. The inability to collect biometrics in a stand-off, covert manner is an identified capability gap which is of interest to the DOD Combatant Commands, and Military Services. The Eagle Eyes System, a biometric identification system designed to capture iris images at distances up to 50 meters and perform biometric matching services against pre-loaded databases, currently under development by Retica Systems Inc. will fill this capability gap. *FY 2008 Accomplishments:* Completed demonstration of Retica's Eagle Eyes System, to capture iris images at distances up to 50 meters and perform biometric matching services against pre-loaded databases. *FY 2009 Plans:* Project completed. Outcome to be used to inform FY 2010 biometrics programs of record.	3.200	0.000	0.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603665D8Z Biometrics Science and Technology	**PROJECT NUMBER** P665

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603670D8Z Human, Social and Culture BehaviourModeling (HSCB) Advanced Development

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	2.960	9.330	11.480						Continuing	Continuing
P370: Human, Social and Culture Behaviour Modeling (HSCB) Advanced Development	2.960	9.330	11.480						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) This program is focused on demonstrating general-use, cross-domain capabilities/tools to support all HSCB application areas. It will develop: Computational modeling capabilities; Visualization software toolsets; and Training/mission rehearsal systems that provide forecasting capabilities for socio-cultural (human terrain) responses at the strategic, operational and tactical levels. The resulting technologies will provide, 1) cultural understanding/overlays in existing intelligence, influence operations, and operations planning systems; 2) training and mission rehearsal capabilities that go beyond strategic level planning tools (to the operational and tactical level), providing broader, more in depth training/retention capability. Establishment of a “testbed” capability to provide a forum for model comparison and demonstration.

Modeling Capabilities that will generate and demonstrate validation of synthetic adversaries to populate "what if" analyses for forecasting reactions to a defined class of adversaries to U.S./coalition Strategic decision making tools that account for political, religious, cultural, and other factors. Integration of a common architecture visualization tool that vertically integrates cultural information into a military operational environment.

Visualization software toolsets that will be used as a strategic decision making tool that will account for political, religious, cultural, and other factors. Integration of a common architecture visualization tool that vertically integrates cultural information into a military operational environment.

Training/Mission rehearsal systems capable of using flexible underlying cultural models to train at the operational/tactical level. Integration and demonstrations of social, cultural and human behavior/cognition skills training systems for operational and strategic planning personnel in a coalition force context.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603670D8Z Human, Social and Culture BehaviourModeling (HSCB) Advanced Development

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	2.974	9.381	11.689	
Current BES/President's Budget	2.960	9.330	11.480	
Total Adjustments	-0.014	-0.051	-0.209	
Congressional Program Reductions				
Congressional Rescissions		-0.051		
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.008			
Other	-0.006		-0.209	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603670D8Z Human, Social and Culture BehaviourModeling (HSCB) Advanced Development					**PROJECT NUMBER** P370	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P370: Human, Social and Culture Behaviour Modeling (HSCB) Advanced Development	2.960	9.330	11.480						Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) This program is focused on demonstrating general-use, cross-domain capabilities/tools to support all HSCB application areas. It will develop: Computational modeling capabilities; Visualization software toolsets; and Training/mission rehearsal systems that provide forecasting capabilities for socio-cultural (human terrain) responses at the strategic, operational and tactical levels. The resulting technologies will provide, 1) cultural understanding/overlays in existing intelligence, influence operations, and operations planning systems; 2) training and mission rehearsal capabilities that go beyond strategic level planning tools (to the operational and tactical level), providing broader, more in depth training/retention capability. Establishment of a “testbed” capability to provide a forum for model comparison and demonstration.

Modeling Capabilities that will generate and demonstrate validation of synthetic adversaries to populate "what if" analyses for forecasting reactions to a defined class of adversaries to U.S./coalition Strategic decision making tools that account for political, religious, cultural, and other factors. Integration of a common architecture visualization tool that vertically integrates cultural information into a military operational environment.

Visualization software toolsets that will be used as a strategic decision making tool that will account for political, religious, cultural, and other factors. Integration of a common architecture visualization tool that vertically integrates cultural information into a military operational environment.

Training/Mission rehearsal systems capable of using flexible underlying cultural models to train at the operational/tactical level. Integration and demonstrations of social, cultural and human behavior/cognition skills training systems for operational and strategic planning personnel in a coalition force context.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Modeling Capabilities	1.500	3.000	3.948	
Generation and demonstration of validated synthetic adversaries driven by underlying HSCB computational modals will be the key to "what if" analyses for forecasting reactions to a defined class of adversaries to U.S./coalition military, economic, or political actions.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603670D8Z Human, Social and Culture BehaviourModeling (HSCB) Advanced Development	**PROJECT NUMBER** P370

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Integration and demonstration of decision making support tools within Battle Command Planning/ Execution/Re-Planning systems for political, religious, cultural and other factors. Development of tools and software products to integrate socio-cultural models and information into existing intelligence, and Command and Control systems. *FY 2008 Accomplishments:* Integratied, demonstrated, and validated human terrain forecasting computational models that enable examination of 2nd, 3rd, and higher order effects of kinetic and non-kinetic actions within a theater. Current software focused on existing social network modeling tools and relatively data poor/outdated theory based models. This work provided a more robust, generalizable set of DoD centric models to support decision aids and toolsets for command and control, intelligence, influence operations and operational planning. Accomplishments: • Developed initial prototype framework for socio-cultural data model assessment. • Categorized multiple modeling efforts focused on understanding attitudes and beliefs, target audience analysis, message dissemination, and other social simulations to support planning. • Conducted a test of advanced modeling capabilities at USPACOM to understand and apply modeling tools for addressing leader analysis in support of COCOM decision making. • Developed experiment protocol for USEUCOM to research multiple model approaches in support to operational objectives. *FY 2009 Plans:* Synthetic forces are useful for doing 'what if' exercises for planning purposes during Phase 0, and during ongoing contingency planning. The synthetic forces used for these wargames/planning exercises are often not an accurate representation of adversary or green forces, and their reactions to U.S./coalition actions. The work will focus on demonstrating regional/cultural models in planning exercises through the use experimental testbeds.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Building upon FY 2008 and FY 2009, in this year, we will leverage: the developed; other models; work performed in visualization; cultural understanding; the development of specific and generalizable cultural models; the work done in the development of data frameworks to demonstrate a partial end to end process that uses the aspects described above; to support specific operational planning tasks for selected government partners via experimental testbeds.				
Training/Mission Rehearsal Systems	0.960	2.330	2.597	
Current methods and procedures for integrating cultural information into military operations do not satisfy the requirements for ongoing operations and are not flexible enough to rapidly deliver Just-In-Time training for complex new regions of interest, and relatively new mission areas (e.g. transition and reconstruction). Training systems capable of using flexible underlying cultural models to train at the operational/tactical level is a requirement. When combined with socio-cultural operational planning tools, they allow users to understand the socio-cultural environment. It is then possible to plan, and potentially rehearse non-kinetic actions prior to execution and make changes based on outcomes.				
FY 2008 Accomplishments: The work integrated and demonstrated training technologies to deliver sociocultural understanding and skills needed by individuals, small units, and coalitions in current and future military operations.				
• Initiated socio-cultural theory based training tool projects that leverage commercial investments in Internet-based technologies and DoD investments in training technologies to support HSCB training and mission rehearsal objectives.				
FY 2009 Plans: The work will demonstrate distributed training technologies to speed the development of socio-cultural skills in such coalitions in current military operations.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: The work will integrate demonstrate socio-cultural training directly supported by hybrid modeling approaches.				
Visualization Software Toolsets This program demonstrates a first generation decision-making toolset that includes HSCB factors. Visualization software toolsets and integration of a common architecture visualization tool that will be used in operational/strategic decision making is the goal. These tools are required to account for political, religious, cultural, and other factors as well as to vertically integrate cultural information into a military operational environment. *FY 2008 Accomplishments:* Developed an implementation plan for prototype geospatial/socio-cultural collection, modeling and visualization technologies that focus on automated extraction of cultural data demonstration as a part of the MAP-HT JCTD. *FY 2009 Plans:* Common, generalizable (strategic to tactical) tools for visualization of Diplomatic Infrastructure Military Economic - Political Military Economic Social Information Infrastructure (DIME-PMESII) or HSCB factors on the battlefield, or during Security, Stability, Transition and Reconstruction phases do not exist. The work will provide an initial demonstration of a common architecture for visualization of these effects, with the ability for commanders to "drill down" from regional to local views, and vice versa. *FY 2010 Plans:* Demonstrate visualization tool sets that can access to underlying geospatial and socio-cultural data, evidentiary information, and associated uncertainty in the same visualization. Demonstrate visualization methods that can deal with sparse data sets.	0.500	4.000	4.935	

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C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
PE 0602670D8Z BA 2/ HSCB Applied Research	6.074	7.643	9.446						Continuing	Continuing
PE 0604670D8Z BA 4 /HSCB Research & Engineering	0.989	5.958	7.006						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603680D8Z Defense Wide Manufacturing Science and Technology Program

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	22.415	18.280	14.638						Continuing	Continuing
P680: Manufacturing Science and Technology Program	22.415	18.280	14.638						Continuing	Continuing

A. Mission Description and Budget Item Justification

Manufacturing Science and Technology (MS&T) provides the Department 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.

MS&T will: 1) address manufacturing enterprise issues beyond a single Component or platform and, 2) establish and mature cross-cutting manufacturing processes required for transitioning emerging technologies which impact the timelines, affordability, and producibility of acquisition programs and shorten the deployment cycle times.

The MS&T program is fundamental to a coordinated development process. Concurrent development of manufacturing processes with the technology prototype enables the use of emerging technologies such as ceramic matrix composites for advanced turbine engines, affordable low observables materials for increased survivability in the kill chain of high value targets, and system-on-chip electronics for communication platforms.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603680D8Z Defense Wide Manufacturing Science and Technology Program

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	23.594	11.981	14.906	
Current BES/President's Budget	22.415	18.280	14.638	
Total Adjustments	-1.179	6.299	-0.268	
Congressional Program Reductions				
Congressional Rescissions		-0.101		
Total Congressional Increases		6.400		
Total Reprogrammings	-0.471			
SBIR/STTR Transfer	-0.661			
Undistributed Reduction	-0.047			
Adjustment reflects internal realignment of funds			-0.075	
Other			-0.193	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P680, **High Performance Manufacturing Technology Initiative** This Congressional add is to fund efforts to identify, advance, and accelerate manufacturing processes and technologies that will achieve productivity and efficiency gains in the defense manufacturing base. Activities include maturing manufacturing process development, strategic planning and roadmapping, development of prototypes and test beds, workshops, incentives, and outreach.		6.400

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603680D8Z Defense Wide Manufacturing Science and Technology Program					**PROJECT NUMBER** P680	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P680: Manufacturing Science and Technology Program	22.415	18.280	14.638						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Manufacturing S&T program has a two-pronged approach: 1) technology initiatives and 2) single specific 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 will be launched annually by the JDMTP to identify technology initiatives and single specific issues requiring investment. The JDMTP is comprised of the ManTech Directors from the Services, Defense Logistics Agency (DLA), Missile Defense Agency (MDA) and Office of Secretary of Defense (OSD). The call will be distributed through the ManTech Directors to the three JDMTP sub panels: Metals Processing and Fabrication Subpanel, Composites Processing and Fabrication Subpanel, and Electronics Processing and Fabrication Subpanel. Potential candidates will be evaluated by the JDMTP based on criteria set forth in the call and announcements and down-selected for further development prior to final selection. Priority will be given to investments that support affordability and producibility of critical enabling manufacturing technologies that cut across multiple platforms. Investments will 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 in collaboration with the JDMTP and in consultation with the Office of Deputy Under Secretary of Defense (Advanced Systems and Concepts) and the Director, Defense Research & Engineering. Technology initiatives and projects will be executed at the Component level.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Ceramic Matrix Composite (CMC) Manufacturing Initiative	1.740	4.246	0.396	
Turbine engines are the main propulsion system for virtually all DoD aircraft and helicopters and also power an array of ships and tanks. Improvements in manufacturing process technology must be achieved with each new generation of engines for these challenging new designs to be manufactured with acceptable quality, cost, and delivery rate to meet the warfighters' needs. This initiative seeks to advance and establish the manufacturing technologies for CMCs needed to support the development, production				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and sustainment of advanced gas turbine engines. Successful efforts will enable the use of CMCs for defense systems, resulting in significant life cycle cost avoidance through improved fuel efficiencies and greatly reduced maintenance costs over metallic flaps and seals and vanes for turbine engines. Outcome: demonstrate the advancement of CMC manufacturing technologies that result in: 1) improved Non-Destructive Evaluation (NDE) techniques, 2) reduced production time, 3) consistent performance of the CMC materials, and 4) reduced unit cost such that CMC materials can be incorporated Advanced Turbine Engines resulting in 1) reduced weight, 2) increased engine performance, 3) decreased maintenance, 4) increased production flow through, and 5) increased safety. Advanced manufacturing material processes will reduce re-work, increase production capacity, and enable production rate requirements for engine components. Life cycle cost avoidance for this initiative is projected in the billions, with technology maturity within 3-5 years. *FY 2008 Accomplishments:* Execution of this budget baseline project was accomplished in coordination with the High Performance Manufacturing Technology Initiative FY 2008 funded CMC efforts described later in this exhibit. Initiated Phase 1 for in-tow coating of silicon carbide (SiC) fiber process improvements, candidate experiments defined, developed and finalized; process model constructed, modified, then used to support conceptual design. *FY 2009 Plans:* 1) NDE Phase 2 specimen design and fabrication refined and completed with NDE process optimized, 2) optimization of production-scale coating of SiC fabrics for CMCs material handling, 3) in-line tow coating equipment modified/validated to support experiments performed on the modified tow coater, and 4) 3-D airfoil inspection sensor-rotor tilt table developed and completed with follow-on system testing and integration. *FY 2010 Plans:* 1) Full-scale concept validation on modified tow coating, real time process metrology finalized, 2) 3D airfoil inspection system process and functionality demonstration with measurement of new process key				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
characteristics, and 3) demonstration of 80m capability of SiC fabric coating with reduction of acceptance time/cost and next generation equipment definition.				
Low Observable Material Manufacturing Initiative Manufacturing Scale-up for Low Observable (LO) Materials and Platforms Outcome: Three key areas: 1) precision component fabrication, 2) multi-spectral LO integration, and 3) minimization of sustainment cost and cycle time drivers. Investment in the three key areas are projected to have a significant multi-million dollar payback throughout the Future Years' Defense Plan and beyond. Technology is expected to mature beginning in FY 2010. Execution of this project is accomplished in coordination with the FY 2008 Disruptive Manufacturing Technology Initiative. *FY 2009 Plans:* Initial scale-up of the key project to meet near-term flight demonstration. Producibility assessment to establish process control, quality goals, and variability reductions. Initial evaluation of pertinent Key Performance Parameters (KPP's). Final scale-up of the key project to meet initial DoD-level needs. Additional flight testing.	0.000	2.135	0.000	
Prosthetics and Orthotics Manufacturing Initiative This project was previously titled " Custom Composite Orthotics and Prosthetics" in the FY 2009 President's Budget. New manufacturing technologies are required for the development of custom composite orthotics and prosthetics for injured men and women of the armed services. Orthotics and prosthetics present a two-fold challenge in that they contain a high degree of customization in design and a labor intensive means of manufacturing. Recent advances in solid modeling, reconfigurable tooling, room temperature resin chemistry, automated fabrication of custom fiber architectures, and novel resin infusion methods have created the potential to develop a highly integrated, low cost, custom orthotic and prosthetic technology to address the unique requirements and needs of the armed services. Rapid prototyping technologies and new composite manufacturing solutions have shown the potential to provide a 24-hour turnaround	1.333	1.778	0.699	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603680D8Z Defense Wide Manufacturing Science and Technology Program	PROJECT NUMBER P680

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
time for component fabrication. The current state-of-the-art for orthotics is to thermoform plastic materials such as polypropylene to create a custom fit orthotic. New manufacturing techniques integrated with advanced polymer composite technologies have allowed for initial prototyping work using woven glass reinforced adiprene. These new materials are compliant, but sufficiently rigid for use with prosthetics. The integration of composite materials could provide up to a 20 percent weight savings and an approximate 40% reduction in skin contact over current thermoform plastic solutions. Outcome: New rapid prototyping and affordable manufacturing processes resulting in 20 percent weight savings and 40 percent reduction in skin contact. Improved reliability of new composite prosthetics. *FY 2008 Accomplishments:* Coordinated with the National Naval Medical Center (NNMC) and Walter Reed Hospital (WRH) to establish a team to develop manufacturing technologies. Conducted Phase 1 - Integration of fiber with new fabrication prototyping of prosthetics and orthotics and conducted proof-of-concept of rapid custom composite prosthetics. *FY 2009 Plans:* Full-scale manufacturing capability for custom composite orthotics and prosthetics. *FY 2010 Plans:* Train NNMC and WRH on prototyping technology.				
System-On-Chip (SOC) Manufacturing Science & Technology (MS&T) investments will enable smaller, less costly Global Positioning Systems (GPS) for artillery platforms by developing the manufacturing technologies to enable reduced weight, size and power consumption to provide leap-ahead communication and sensor capability by maturing technologies that move heavy, high volume/power demand systems to small, power efficient System-On-Chip (SOC) packaging technology.	1.739	0.926	1.275	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Outcome: MS&T will move the basic packaging technology from Manufacturing Readiness Level (MRL) 3 to qualification for application in the Ground-Based GPS Receiver Application Module (GB-GRAM) 105mm Smart artillery round (PKG II) as the initial adopter. Manufacturing S&T investments will refine the fabrication process, develop design rules for complex integration of non optimized mixed devices on same silicon, and accelerate the development and integration of the transmit and receive module that can be used for downstream system application.. *FY 2008 Accomplishments:* Completed baseline technical milestones. Initiated L1/L2 Radio Frequency (RF) Module Development deliverable, defined requirements and began design phase. *FY 2009 Plans:* Continue L1/L2 RF module development work, concluding design, fabrication, test/evaluation, and documentation phases; deliver functional modules. Begin requirements definition of GPS module development deliverable. Continue GPS module development work, completing design, fabrication, test/evaluation, and documentation phases. Deliver functional modules and characterization data. *FY 2010 Plans:* Complete design/integrate into GB-GRAM deliverable, including specifications development, design, fabrication, integration/test, documentation, and the issuance of a final technical report.				
Direct Digital Manufacturing Inspection and Distortion Control Develop inspection methods for direct digital manufacturing via electron beam free form fabrication (EBFFF) of metallic components for air, sea, and land based systems to ensure quality parts. Develop thermal control strategies to alleviate thermal residual stresses built up via EBFFF that would put the part out of dimensional tolerances and sacrifice structural properties required for service applications. *FY 2009 Plans:* Initiate efforts in inspection and distortion control of EBFFF metallic components.	0.000	0.569	1.541	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2010 Plans: Deliver inspection methods and new processes for distortion control for EBFFF metallic components.				
Manufacturing Readiness Assessment (MRA) Capability OSD is establishing a capability which will include a requirement for Department of Defense major acquisition programs to perform an MRA prior to major milestone reviews. This is intended to address the large and continuing unfavorable deviations in cost and schedule performance in major acquisition programs which have been attributed in part to insufficient knowledge of manufacturing readiness of technologies as well as insufficient knowledge of the manufacturing readiness of the industrial capabilities (production processes, equipment, systems, tooling, materials and supplier base) that produce the systems. The MRA capability will provide for the following: input to the development of related Defense Acquisition University (DAU) curriculums; provide competent technical advice to Defense Acquisition Board (DAB) principals on manufacturing readiness issues and policies; review and analyze the results of field-conducted MRAs; participate, as appropriate, in MRAs conducted by field organizations to support DAB milestone decisions; conduct independent MRAs; and provide advice to field organizations on manufacturing readiness matters. Outcome: A capability which will include a requirement for major DoD acquisition programs to perform an MRA prior to major milestone reviews. This is intended to address the large and continuing unfavorable deviations in cost and schedule performance in major acquisition programs which have been attributed in part to insufficient knowledge of manufacturing readiness of technologies as well as insufficient knowledge of the manufacturing readiness of the industrial capabilities (production processes, equipment, systems, tooling, materials and supplier base) that produce the systems. *FY 2009 Plans:* Implement MRA requirements across the Department; develop DAU curriculum and establish training requirements; assist in initial MRA performed at field activities to develop a most efficient process and appropriate guidance.	0.000	2.250	5.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Implement MRA requirements across the Department; develop Defense Acquisition University (DAU) curriculum and establish training requirements; assist in initial MRA performed at field activities to develop a most efficient process and appropriate guidance. Full complement of personnel and staffing arrive onboard and engaged in the MRA initiative.				
Emerging Manufacturing Emerging Manufacturing is a series of new efforts addressing advanced manufacturing technologies and enterprise business practices for defense applications. Initiatives and projects under development will continue to identify and transition advanced manufacturing processes/technologies and business practices that will achieve significant productivity and efficiency gains in the defense manufacturing base. There are four key focus areas: directed energy, survivability, disruptive green and electronic technology, and manufacturing best practices. In directed energy, manufacturing improvements are sought for ground, sea, air, and space based directed energy weapons to enable fielding of these weapons on cost and schedule. In addition, manufacturing improvements are also sought for human and sensor protection against directed energy threats. In survivability, manufacturing improvements are sought for ballistic protection for both personnel and weapon systems, for low observables, and for countermeasures so that our personnel and systems can be protected affordability and on schedule. In disruptive green and electronic technology, manufacturing improvements are sought for improvements in power and energy sources such as lithium ion batteries, solar cells, and fuel cells to enable affordable and reliable fielding of these energy sources, in green technologies such as lead-free solder, nanotechnology for electronics, and other environmentally friendly manufacturing methods to reduce the hazardous waste stream in the industrial base and in the logistics depots, and in fuel efficiency through lightweight structures and advanced propulsion for ground, sea, air, and space structures.	0.000	0.000	5.727	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Launch programs in the areas of directed energy, survivability, disruptive green and electronic technology, and manufacturing best business practices.				
High Performance Manufacturing Technology Initiative	7.690	6.376	0.000	
These FY 2008 and FY 2009 Congressional adds (as adjusted for DoD Appropriation General Provisions) are provided to fund efforts to identify, advance, and accelerate manufacturing processes and technologies that will achieve productivity and efficiency gains in the defense manufacturing base. Activities include maturing manufacturing process development, strategic planning and roadmapping, development of prototypes and test beds, workshops, incentives, and outreach. *FY 2008 Accomplishments:* - Network centric manufacturing provided a proof of concept "process" pilot demonstration on critical spare parts for the M2 machine gun. It modeled, simulated, created and stored qualified manufacturing processes; linked design and manufacturing process information at Army Engineering Support Activities; established agile supply chains based upon end item weapon system heuristics; and transitioned pilot demonstration results to the industrial base - Modeled Based enterprise to develop processes for the integration of design models with analysis tools; identification of critical design features based on technology and manufacturing maturity, cost, quality, reliability or schedule risk; visualization of assembly operations at multiple levels of detail; integration of high fidelity cost models at all levels of design and system integration; and, prediction and analysis of supply chain risks. - Ceramic Matrix Composites (CMC): Executed in coordination with the CMC project described earlier in this exhibit. Initiated Phase 1 for optimizing and validating Non-Destructive Evaluation (NDE) techniques for CMCs, Organic Matrix Composites (OMC) and Metallic airfoils. Phase 1 included; 1) initiated processing and NDE of CMCs to mature reliability and repeatability of manufacturing processes; initiated the design and fabrication of CMC specimens containing material, processing or geometric defects for validation of NDE processes, 2) established leader cloth attachment refinement for silicon carbide (SiC) fabric coating throughput improvements, and 3) initiated optimization and validation of alternative dimensional inspection methods for complex three-dimensional (3D) airfoils.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: - Conduct joint government and industry workshops including 1) workshop for incentives and hurdles to adopting new manufacturing technologies, and 2) a joint DoD/NASA workshop on innovation from product design to manufacturing process. - Benchmark both commercial and Defense product lines to establish state-of-the-art and best practices to develop model-based enterprise and collaborative manufacturing investment strategies and thrusts. - Establish additional network centric manufacturing pilot demonstrations in conjunction with other services and agencies. - Deliver model based enterprise tools for:integration of design models with analysis tools; identification of critical design features based on technology and manufacturing maturity, cost, quality, reliability or schedule risk; visualization of assembly operations at multiple levels of detail; integration of high fidelity cost models at all levels of design and system integration; and, prediction and analysis of supply chain risks.				
Disruptive Manufacturing Technology Initiative This is an FY 2008 Congressionally added effort to mature manufacturing processes needed to transition emerging, disruptive technologies which offer leap ahead capability for future warfighting within the next decade. This initiative will execute the following capability areas: - Solder free electronics: The development and deployment of solder free electronic subsystems would likely result in 1) increased reliability (through elimination of main failure modes); 2) reduced size and weight due to novel packaging techniques; 3) enhanced system performance due to greater individual device tolerances; and 4) reduced hazardous material waste streams. - Fixed and rotary wing airframes: the aim of this program will be to dramatically reduce the overall cycle and turnaround times in order to reduce both costs and lead times for airframes for fixed and/or rotary wing aircraft. Results will include: 1) Achievement of dramatic reductions in nonrecurring fabrication and assembly tooling (jig) costs, numbers, and leadtime; 2) widespread application of unitized structures for	7.690	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
composite and metallic aircraft; 3) innovative approaches reducing capital requirements for drilling and milling for structural assembly. - Conformal load bearing antennas: objective of this program is to dramatically reduce the manufacturing cost and lead times of conformal, load-bearing antenna structures (CLAS) by identifying and refining the requisite manufacturing technologies required for future manned and unmanned platforms - Low Observable Material Manufacturing Initiative: Develop flexible, affordable process meeting multiple weapon system requirements, scale up process to meet demand, *FY 2008 Accomplishments:* FY 2008 Accomplishment: Contracts awarded to develop alternatives: - Solder in defense electronics: eliminated the use of leaded solder in the manufacture, assembly of electronic systems and demonstrated applicable repair and rework techniques to support the sustainment portion of the system life cycle - Fixed and rotary wing airframes: enable fundamental changes to airframe manufacturing to significantly reduce cost and schedule: provide a design and manufacturing approach that is rate flexible; provide increased design and manufacturing flexibility for multi-variant platforms; easily accommodate structural design changes into the manufacturing process - Conformal load bearing antennas: 1) maturation of the manufacturing capability which automates, controls and reduces CLAS fabrication and assembly costs with improved fidelity and accuracy; 2) scale up of innovative materials and manufacturing processes that can be readily incorporated into a CLAS production facility; 3) CLAS manufacturing technology issues including but not limited to modular design concepts, low cost tooling concepts, process controls and inspection methods for both structural and electrical components, material handling and compatibility, deposition of conductive or dielectric materials onto complex surfaces; 4) identification of current, planned or proposed weapon systems would benefit from the identified CLAS cost reduction techniques/technologies with anticipated cost savings and/or capability improvements - Low Observable (LO) Material Manufacturing Initiative: 1) Precise component fabrication; 2)multi-spectral LO integration; 3) minimize sustainment cost and cycle time drivers				
Global Collaborative Manufacturing Architecture	0.300	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
This project was funded via a below-threshold reprogramming in FY 2008. Development of a Global Collaborative Manufacturing Architecture (GCMA) in support of the FY 2008 National Defense Authorization Act direction to the SecDef to develop a Manufacturing Technology program strategic framework and a strategic plan to guide both government and industry high potential investments in Manufacturing Technology in order to leverage benefits in industrial technology availability, acquisition and sustainment program cost, schedule and performance risk reduction. Outputs and efficiencies: Develop a strategy and approach for the creation, development and maintenance of a GCMA based on the principles and best practices. The process developed as part of this task will lead to an extensible frame work for the GCMA, plus tools for gap analysis, transition planning, investment management, and assessment of capability improvement. The planning and development process will include plans for capturing and incorporating important initiatives such as Model-Based Enterprise, Network Centric Manufacturing, the Supply-Chain Operations Reference (SCOR) supply chain management model, and acquisition reform strategies. The process will encompass aerospace & defense industry representatives as well as global manufacturing best practices from the commercial sector. The framework description shall include the use of a DoD architecture framework (DoDAF) overlay (Roundtrip Matrix) to serve as the guide and measure for the GCMA scope and expected outcomes as well as establishing the requirements for participation by GCMA stakeholders. *FY 2008 Accomplishments:* - Developed a strategy and approach for the creation, development and maintenance of a GCMA based on the principles and best practices. - Developed a Plan of Action and Milestones (POA&M) that will describe further Increments of the GCMA. - Created a high level GCMA framework and other DoDAF products that shall be the basis of future development for the GCMA. These products shall be referred to as Increment 0 of the GCMA and shall include an Overview Description (AV-1), the GCMA Integrated Definitions and Dictionary (AV-2) and the high-level, Capabilities-based GCMA Activity Diagram (OV-5).				
Clafin University Detections and Remediation Response to Bioligical and Chemical Weapons Project	1.923	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The 1.923 was placed in the wrong PE and subsequently moved to realign for proper execution. This actions realigns $1.923 million funding for the Clafin University Detections and Remediation Response to Bioligical and Chemical Weapons Project within the Research, Development, Test, and Evaluation, Defense-Wide, 08/09, appropriation for proper execution. The funds are realigned to BA1 Basic Research from BA3, Advanced Technology Development. This is a congressional special interest item. *FY 2008 Accomplishments:* This actions realigns $1.923 million funding for the Clafin University Detections and Remediation Response to Bioligical and Chemical Weapons Project within the Research, Development, Test, and Evaluation, Defense-Wide, 08/09, appropriation for proper execution. The funds are realigned to BA1 Basic Research from BA3, Advanced Technology Development. This is a congressional special interest item.				

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C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
(BA3) 0603680F/Air Force ManTech	0.000	56.376	40.523						Continuing	Continuing
(BA7) 0708045A/Army ManTech	91.305	90.782	69.479						Continuing	Continuing
(BA7) 0708011F/Air Force ManTech	50.186	0.000	0.000						0	50.186
(BA7) 0708011N/Navy ManTech	56.862	61.713	57.513						Continuing	Continuing
(BA7) 0708011S/DLA ManTech	56.057	55.130	20.803						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603711D8Z Joint Robotics Program/Autonomous Systems

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	18.734	9.198	9.110						Continuing	Continuing
P710: Joint Robotics Program/Autonomous Systems	18.734	9.198	9.110						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports the advanced technology development activities of the Joint Ground Robotics Enterprise (JGRE) with a focus on the development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in simulated environments. Projects deliver advanced technology with direct relevance to enhancing warfighters' capabilities that have been identified during operational assessments and field feedback of current unmanned systems. By exercising its oversight role through a technology advisory board, O-6 Council and Senior Steering Group (Flag level), Joint Ground Robotics applies this program to enable coordination between the Services and places emphasis on interoperability and commonality among unmanned ground systems. The primary purpose of this program is to support efforts to overcome technology barriers in the thrust areas of unmanned ground system technologies to include Autonomous & Tactical Behaviors, Manipulation Technologies, Collaborative Operations, Interoperability, Man-portable Unmanned Ground Systems, and Technology Transition/Transformation. Development and integration of technologies within the thrust areas of unmanned ground system technologies will expedite technology transition from the laboratory to operational use. The technologies are generally at Technology Readiness Levels (TRL) of 4, 5, or 6 with transition and transformation activities critical to closing the warfighter requirement capability gap.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	19.585	8.449	9.276	
Current BES/President's Budget	18.734	9.198	9.110	
Total Adjustments	-0.851	0.749	-0.166	
Congressional Program Reductions				
Congressional Rescissions		-0.051		
Total Congressional Increases		0.800		
Total Reprogrammings	-0.500			
SBIR/STTR Transfer	-0.312			
Undistributed Reductions	-0.039			
Other			-0.166	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603711D8Z Joint Robotics Program/Autonomous Systems

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P710, **Joint Ground Robotics Enterprise Modeling, Simulation, Analysis Project**		0.800

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APPROPRIATION/BUDGET ACTIVITY	**R-1 ITEM NOMENCLATURE**	**PROJECT NUMBER**
0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	PE 0603711D8Z Joint Robotics Program/Autonomous Systems	P710

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P710: Joint Robotics Program/Autonomous Systems	18.734	9.198	9.110						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports the advanced technology development activities of the Joint Ground Robotics Enterprise (JGRE) with a focus on the development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in simulated environments. Projects deliver advanced technology with direct relevance to enhancing warfighters' capabilities that have been identified during operational assessments and field feedback of current unmanned systems. By exercising its oversight role through a technology advisory board, O-6 Council and Senior Steering Group (Flag level), Joint Ground Robotics applies this program to enable coordination between the Services and places emphasis on interoperability and commonality among unmanned ground systems. The primary purpose of this program is to support efforts to overcome technology barriers in the thrust areas of unmanned ground system technologies to include Autonomous & Tactical Behaviors, Manipulation Technologies, Collaborative Operations, Interoperability, Man-portable Unmanned Ground Systems, and Technology Transition/Transformation. Development and integration of technologies within the thrust areas of unmanned ground system technologies will expedite technology transition from the laboratory to operational use. The technologies are generally at Technology Readiness Levels (TRL) of 4, 5, or 6 with transition and transformation activities critical to closing the warfighter requirement capability gap.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Autonomous & Tactical Behaviors and Collaborative Operations	8.514	3.642	3.767	
FY 2008 Accomplishments: * Evaluated Software Integration Lab (SIL) connection to the Virtual Autonomous Navigation Environment (VANE). * Demonstrated deliberative navigation and obstacle avoidance for unmanned surface vehicles using digital nautical charts, marine radar and AIS sensor fusion. * Developed detection and exploration behavior for enhanced autonomous navigation and more efficient search patterns in urban environments. * Demonstrated human presence detection based on fused thermal and color cameras, and investigated performance when integrated with navigation and change-detection behaviors. * Optimized 3-D augmented virtual interfaces for multiple robot control.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Evaluated various speech recognition engines for multi-modal robot control interfaces. * Implemented demonstrations of realistic autonomous capabilities to EOD users. *FY 2009 Plans:* Support the development of platform onboard intelligence and tactical behaviors to allow the fielding of advanced autonomous unmanned ground systems support. Baseline user identified mission scenarios to develop operational behaviors enabling unmanned operations. *FY 2010 Plans:* Increase the warfighter's capability by transferring and developing technologies that will have an immediate impact on the autonomy and functional capabilities of current and future robotic systems. Integrate communication, mission planning, interface technologies, and advanced intelligence capabilities to support collaborative operations between manned and unmanned systems.				
Interoperability *FY 2008 Accomplishments:* * Completed transition to fully Joint Architecture for Unmanned Systems (JAUS) Level 2 software architecture for small UGV semi-autonomous navigation (Man-Portable Robotic Systems [MPRS]. * Developed new JAUS components to enable USV path planning and reactive obstacle avoidance within the JAUS architecture. * Expanded generic behavior architecture (Autonomous UAV Mission System [AUMS]) to include generic classes of perceptions, mission payloads, behaviors, and communication protocols (JAUS included). * Optimized a navigation package consisting of obstacle avoidance, mapping and path planning, GPS waypoint following, adaptive localization, and seamless indoor/outdoor navigation and enhanced dead reckoning. * Successful hardware validation of Joint Collaborative Technologies Experiment (JCTE)-Joint Architecture for Unmanned Systems (JAUS) Interface Design Document. * Refined, maintained and transitioned documentation for the Joint Architecture for Unmanned Systems (JAUS) reference architecture to an industry standard via the Society of Automotive Engineers (SAE).	1.779	1.039	1.027	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603711D8Z Joint Robotics Program/Autonomous Systems	**PROJECT NUMBER** P710

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Promote and guide technology development to meet joint requirements and promote ground as well as air unmanned systems interoperability. Optimize best features of prior/ongoing architecture efforts into a maturing, standardized system that can be easily ported to robotic platforms used DoD-wide. * Rapid Prototyping & Integration of Robotic Systems - A systems engineering approach to the design and implementation of software for prototyping robotic systems. * Robotic Systems Technical & Operational Metrics Correlation. * Joint Collaborative Technologies Experiment (JCTE). * Joint Architecture for Unmanned Systems (JAUS). *FY 2010 Plans:* Support the bridging of currently incompatible robots and controllers from various manufacturers, using different communications channels and hardware. Promote the adoption of these standards by commercial standards organization.				
Man-Portable Unmanned Ground System Technologies and (U) Manipulation Technologies *FY 2008 Accomplishments:* * Evaluated Software Integration Lab (SIL) connection to the Virtual Autonomous Navigation Environment (VANE). * Demonstrated stereovision based obstacle avoidance and guarded tele-operation under Man-Portable Robotic Systems (MPRS) projects. * Initiated improvement program for integration of UGV in combat. * Completed transition of selected JAUS Level 2 software architecture for small UGV semi-autonomous navigation. * Initiated engineering change proposals (ECP) for manipulator technologies - manipulator strengthening. *FY 2009 Plans:* Enable transitioning of technologies appropriate for small robots from the technology transfer program to fielded systems, including support to the identification of a modeling & simulation (M&S) architecture and specifications with EOD robot specific mission-application. Specific technologies include obstacle	4.679	3.244	3.103	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
detection/obstacle avoidance (ODOA), collaborative behaviors for small vehicles, and the ability to transport equipment and supplies through various terrains and environments. *FY 2010 Plans:* Incorporate existing technologies into systems representative to those in use, demonstrate ease of robotic manipulation, support the development of mobile manipulation, expedite the transition and integration of corresponding robotic technologies to enhance the current fielded systems with more functionalities, autonomy and state-of-the-art behavior.				
Technology Transition/Transformation *FY 2008 Accomplishments:* * Transitioned unmanned vehicle technologies from unmanned ground vehicles to unmanned surface vehicles (USV) to rapidly increase USV autonomous navigation software development. * Demonstrated robotic search behaviors with a radiological sensor. * Demonstrated stereovision based obstacle avoidance and guarded tele-operation. * Ported integration navigation package consisting of obstacle avoidance, mapping and path planning, GPS waypoint following, adaptive localization, and seamless indoor/outdoor navigation, enhanced dead reckoning, and 3-D visualization tools to a ruggedized payload on an iRobot PackBot for user evaluation in a relevant environment. * Evaluated and integrated robotic search behavior with radiological sensor from industry. * Evaluated acoustic sensor into a detection system, a video contrast enhancement module on iRobot PackBot and leave behind sensors. *FY 2009 Plans:* Facilitate integration of and ensure the ultimate transfer or transformation of technologies to ongoing programs. Exploit the best features of past and on-going efforts while supporting the development of technologies that have low risk to transition. Technologies of interest include Interface Technologies (Human Robot and Robot to Robot Interaction), Autonomous Operations (Information Fusion, Tele-operation and Non-line of Sight Perception, and Navigation), and Autonomous Technologies (Tactical Behaviors and Positioning).	3.762	1.273	1.213	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603711D8Z Joint Robotics Program/Autonomous Systems	**PROJECT NUMBER** P710

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Facilitate integration of and ensure the ultimate transfer or transformation of technologies to ongoing programs. Exploit the best features of past and on-going efforts while supporting the development of technologies that have low risk to transition. Technologies of interest include Interface Technologies (Human Robot and Robot to Robot Interaction), Autonomous Operations (Information Fusion, Tele-operation and Non-line of Sight Perception, and Navigation), and Autonomous Technologies (Tactical Behaviors and Positioning).				

C. Other Program Funding Summary ($ in Millions)

	FY 2008	**FY 2009**	**FY 2010**	**FY 2011**	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**Cost To Complete**	**Total Cost**
(BA4) PE 0603709D8Z / Joint Robotics Program	23.251	11.782	11.803						Continuing	Continuing
(BA5) PE 0604709D8Z / Joint Robotics Program	6.710	5.694	5.127						Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	65.780	68.659	69.175						Continuing	Continuing
P470: Strategic Environmental Research and Development Program (SERDP)	65.780	68.659	69.175						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 Management, Sustainable Infrastructure, 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.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	69.071	69.038	70.438	
Current BES/President's Budget	65.780	68.659	69.175	
Total Adjustments	-3.291	-0.379	-1.263	
Congressional Program Reductions				
Congressional Rescissions		-0.379		
Total Congressional Increases				
Total Reprogrammings	-1.780			
SBIR/STTR Transfer	-1.373			
Internal realignment of funds to meet DDR&E priorities	-0.138			
Balance attributed to undistributed reductions levied by legislative policies			-0.352	
Other			-0.911	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)					**PROJECT NUMBER** P470	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P470: Strategic Environmental Research and Development Program (SERDP)	65.780	68.659	69.175						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 Management, Sustainable Infrastructure, 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. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Environmental Restoration	20.648	20.149	18.687	
Environmental Restoration (ER) reduces DoD's liabilities by developing technologies for the cost-effective detection, characterization, containment, and remediation of contamination in soil, sediments, and water.				
FY 2008 Accomplishments: Science and technology advancements were made to address DoD's emerging groundwater issues, sediment contamination, sustainment of test and training ranges, managing persistent DoD contamination, and improve the monitoring and optimization of DoD remediation efforts. New investments were initiated to advance our understanding of explosive biodegradation, reduce the cost of				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)	**PROJECT NUMBER** P470

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
long term monitoring, and understand the impacts of contaminated source zones on groundwater plumes. A major accomplishment was the development of wildlife toxicity data for munitions compounds. These data allowed DoD managers to make informed risk based decisions and limit the requirement for costly site specific risk assessments. Details on all SERDP ER projects can be found at www.serdp.org. *FY 2009 Plans:* SERDP will continue to improve scientific understanding and develop innovative cost effective methods in support of DoD's remediation efforts and the sustainment of DoD ranges. New initiatives will address the areas of managing large dilute plumes of contaminated groundwater, improved identification of munitions constituent source zones on DoD ranges, improved understanding of vapor intrusion pathways from chlorinated solvent contaminated groundwater, improved understanding of the fate and transport of munitions constituents, and improved understanding of environmental parameters and sampling methods on measured groundwater contaminant concentrations. A description of all new FY 2009 ER projects can be found at www.serdp.org. *FY 2010 Plans:* New research initiatives will focus on innovative risk assessment approaches for military unique compounds, the options and limitations for treatment of persistent contaminated groundwater plumes, and bioavailability of contamination found on DoD ranges and sediments. Details are available at www.serdp.org.				
Munitions Management (MM) Munitions Management (MM) 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 reduced generation of UXO during live fire testing and training operations.	13.328	14.181	14.493	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)	**PROJECT NUMBER** P470

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Investment in munitions management yielded new technologies to address the difficult and persistent issues faced by the Military Munitions Response Program. Technology advancements continued in the areas of ground based detection and discrimination, wide area assessment, detection of underwater UXO, and advanced planning and assessment tools. Investigators continued to use the two standardized test sites for the evaluation of UXO detection technologies and continued efforts to improve sensor designs and improve detection and discrimination methods. A major accomplishment was the successful development of a new micro-fabricated total field magnetometer which will reduce the size, cost, and power required over currently fielded instruments by orders of magnitude. Details on all SERDP MM projects can be found at www.serdp.org. *FY 2009 Plans:* New initiatives will continue to focus on advanced sensors, signal processing, supporting technologies and protocols. Notably is the development of more capable hand held sensors for detecting and discriminating buried UXO and systems for the detection and discrimination of underwater munitions. In addition, projects will be funded to analyze data obtained from recent live site discrimination tests to improve current algorithms and develop new discrimination approaches. A description of all new FY 2009 MM projects can be found at www.serdp.org. *FY 2010 Plans:* New research initiatives will focus on advancements in underwater UXO detection and discrimination, advanced sensors, signal processing, supporting technologies, and protocols to reduce the costs associated with detecting and remediating UXO. Details are available at www.serdp.org.				
Sustainable Infrastructure Sustainable Infrastructure (SI) develops the science and technologies required to sustain training and testing ranges and installation infrastructure as well as the base camps required for deployed forces.	18.026	19.651	18.698	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Science and technology advancements were made to improve DoD's ecosystem based management, protection of threatened and endangered species and marine mammals, management of cultural resources on DoD lands, and protection of watersheds to sustain military test and training lands. Continued investments were made to address issues of noise, air quality, and energy to support the long term cost effective sustainability of military installations. New initiatives included efforts to address critical natural resources issues straining the management of military installations in the pacific islands and the development of advanced technologies to reduce the energy needs of deployed forces. A major accomplishment was the successful development of new techniques for and a spatial decision support systems to predict the location and densities of marine mammals in support of critical Navy operations. New more accurate assessments and forecasts for marine mammal densities will support scientifically based regulatory decisions. Details on all SERDP SI projects can be found at www.serdp.org. *FY 2009 Plans:* SERDP will continue efforts to address persistent issues that severely impact installation readiness and the ability to support training and testing. New initiatives will develop an understanding of the mechanisms of forest decline on installations in the Southeast, assess the impacts of potential sea level rise on military infrastructure across the United States and climate change on coastal ecosystems on military lands in the southeast, and develop tools to predict the impact of military training activities on archeological resources on DoD lands. A description of all new FY 2009 SI projects can be found at www.serdp.org *FY 2010 Plans:* New research initiatives will assess the impact of climate change on military lands in the southwest and improve our understanding and develop tools to manage the generation of dust due to military activities on our ranges. Details are available at www.serdp.org.				
Weapons Systems and Platforms	13.778	14.678	17.297	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Weapons Systems and Platforms (WP) develops technologies and materials that reduce the waste and emissions associated with the manufacturing, maintenance, and use of DoD weapons systems and platforms to reduce future environmental liabilities and their associated costs and impacts. *FY 2008 Accomplishments:* Continuing efforts focused on advanced surface engineering and structural materials to eliminate hazardous materials from DoD assets, the assessment and management of noise and emissions from military platforms, development of green alternative munitions and energetics, and the elimination of hazardous waste in the maintenance and management of military systems. New efforts were initiated in the following areas: Environmentally Benign, High-Strength Fasteners for Weapons Systems; Scientific Understanding of Non-Chromated Corrosion Inhibitors Function; Environmentally Benign Pyrotechnics Assemblies; and Understanding Volatile Particle Emissions from Military Aircraft. A significant accomplishment was the development of new techniques to measure the emissions from military gas turbine engines. New high quality emissions data will directly support basing decisions and future engine development. Details on all SERDP WP projects can be found at www.serdp.org. *FY 2009 Plans:* The Weapons Systems and Platforms program will continue to focus on development of 'green' energetics, munitions, and weapons systems components as well as innovative life-cycle-based coating systems for military aircraft and land based platforms that eliminates volatile organic compounds, heavy metal constituents, and associated hazardous air pollutants. New efforts will be initiated in advanced methods for removing solid waste from shipboard waste streams, characterization of open burn/open detonation of energetics, environmentally benign aircraft deicing and anti-icing, new techniques to predict corrosion protection, and the science behind military paint strippers. A description of all new FY 2009 WP projects can be found at www.serdp.org *FY 2010 Plans:* New initiatives are planned to develop alternatives to perchlorate for missile systems, replacement for the military uses of the global warming gas SF6, new military cleaners and paint stripping techniques,				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
sustainable materials and processes for military composites, and a scientific understanding of the impacts of lead free electronics in military hardware. Details are available at www.serdp.org.				

C. Other Program Funding Summary ($ in Millions)

N/A

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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COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	10.635	12.031	11.135						Continuing	Continuing
P727: Joint Warfighting	10.635	12.031	11.135						Continuing	Continuing

A. Mission Description and Budget Item Justification

The OSD Joint Warfighting Program (JWP) account supports two related activities supporting the Department's Joint Experimentation. The Joint Advanced Warfighting Program (JAWP) captures lessons learned and assessments from contingency operations to inform resource allocation, and the Direct Analysis Support for Combatant Commander (DASCC) account enables Combatant Commands to examine operational needs and capability gap alternatives via limited objective experiments and concept development.

The Joint Advanced Warfighting Program (JAWP) is supported by the Office of the Secretary of Defense (OSD) Policy and AT&L, with the continuing concurrence of the Joint Staff (J7) to serve as a catalyst for critical analysis and development of innovative concepts on an accelerated basis. The JAWP provides an independent capability for joint warfare analysis and bridges operational lessons learned in the Combatant Commands with joint experimentation conducted at US Joint Forces Command and the other Combatant Commands. This program fuses a team of civilian operational analysis experts with mid-grade and senior military officers to provide first-hand research into topics of pivotal importance to current and future joint campaigns. These analyses serve as a basis for formulation and assessment of advanced concepts and capabilities, identifying enabling technologies and operational integration options for the Department. Resultant concepts drive changes in the doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of the Services. The JAWP serves an essential, expert, and independent feedback role in identifying, exploring and evaluating breakthrough war fighting capabilities. It captures and builds on lessons learned from joint contingency operations and earlier joint and Service experimentation. From that foundation, it identifies and helps formulate advanced joint concepts, explores their effectiveness by recommending design and conduct of joint experiments, and helps streamline implementation processes. Its work complements and supports the activities of Joint Forces Command, the Joint Staff, CoComs and OSD.

The Direct Analysis Support for Combatant Commands (DASCC) activity invigorates Combatant Command staffs participation in joint experimentation as a fundamental element of joint capability development. This activity assists CoComs to specify operational needs and examine capability gap alternatives. Through this activity, JWP also directly funds CoComs specific operational needs and examines capability gap alternatives. The process assesses military contingency operations and formulates advanced joint concepts to be tested and refined via experiments, doctrine development, and demonstrations. The JWP directly enfranchises the CoComs to employ capabilities for mission needs analysis and joint experimentation. This JWP investment strategy expands earlier practice of offsetting costs for Defense Adaptive Red Team/DART services to the CoComs. Likewise, the DASSC incorporates the former Technology Feeder Support (TFS). It aims to reinvigorate CoCom staff capabilities to employ rigorous analysis and experimentation methodologies in support of their specific mission assignments. By empowering CoCom staffs to critically assess their own needs and examine viable capability gap solutions, the JWP aims to focus larger research and development investments, like Joint

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603727D8Z Joint Warfighting

Experimentation and Joint Capability Technology Demonstrations to specific warfighter requirements. The JWP enables joint commanders to conduct limited objective experiments in theater that explore capability gaps and potential capability solutions unique to their mission set. The JWP is intended to be seed funding encouraging leveraged employment of existing defense analysis and experimentation infrastructure such as networked access to the centralized Joint Futures Laboratory facilities at U.S. Joint Forces Command. This approach minimizes redundant investment, strengthens the relevance of defense analysis and experimentation projects, and diversifies the range of solutions considered for pursuit by the department.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	10.964	11.098	11.339	
Current BES/President's Budget	10.635	12.031	11.135	
Total Adjustments	-0.329	0.933	-0.204	
Congressional Program Reductions				
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.307			
Undistributed reductions	-0.022			
Internal realignment of funds		0.933	-0.057	
Other			-0.147	

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P727: Joint Warfighting	10.635	12.031	11.135						Continuing	Continuing

A. Mission Description and Budget Item Justification

Centralized funding for Defense Joint Experiment (JE) was established in FY 2000 in Navy PE 060372N. US Joint Forces Command (USJFCOM) was designated as executive agent for this funding. A smaller residual analysis and experimentation support account for was deliberately maintained under the aegis of the Office of the Director, Defense Research & Engineering (DDR&E) to provide leverage over the larger USJFCOM account, and to establish an independent capability for joint warfare analysis. This OSD Joint Warfighting Program (JWP) account supports the Joint Advanced Warfighting Program (JAWP) and directly empowers joint commanders' ability to conduct analysis and experimental concept development.

The Joint Advanced Warfighting Program (JAWP) is strongly supported by the OSD Policy and AT&L, with the continuing concurrence of the Joint Staff (J7) to serve as a catalyst for critical analysis and development of innovative concepts on an accelerated basis. This program fuses a team of civilian operational analysis experts with mid-grade and senior military officers to provide first-hand research into topics of pivotal importance to current and future joint campaigns. These analyses serve as a basis for formulation and assessment of advanced concepts and capabilities, identifying enabling technologies and operational integration options for the department. Resultant concepts drive changes in the doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) of the Services. The JAWP serves an essential, expert, and independent feedback role in identifying, exploring and evaluating breakthrough war fighting capabilities. It captures and builds on lessons learned from joint contingency operations and earlier joint and Service experimentation. From that foundation, it identifies and helps formulate advanced joint concepts, explores their effectiveness by recommending design and conduct of joint experiments, and helps streamline implementation processes. Its work complements and supports the activities of Joint Forces Command, the Joint Staff, CoComs, and the OSD.

An invigorated defense enterprise for joint experimentation is a fundamental element of joint capability development. Elements of the JWP assist CoComs to specify operational needs and examine capability gap alternatives. The JWP also directly funds CoComs specific operational needs and examine capability gap alternatives. The processes assess military contingency operations and formulate advanced joint concepts to be tested and refined via experiments, doctrine development, and demonstrations. The JWP directly enfranchises the CoComs to employ capabilities for mission needs analysis and joint experimentation. This JWP investment strategy expands earlier practice of offsetting costs for defense Adaptive Red Team/DART services to the CoComs. It aims to reinvigorate CoCom staff capabilities to employ rigorous analysis and experimentation methodologies in support of their specific mission assignments. By empowering CoCom staffs to critically assess their own needs and examine viable capability gap solutions, the JWP aims to focus larger research and development investments, like Joint Experimentation and Joint Capability Technology Demonstrations to specific warfighter requirements. The JWP enables joint commanders to conduct limited objective experiments in theater that explore capability gaps and potential capability solutions unique to their mission set. The JWP is intended to be seed funding encouraging leveraged employment of existing defense analysis and experimentation infrastructure such as networked access to the centralized Joint Futures Laboratory facilities at U.S. Joint Forces

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Command. This approach minimizes redundant investment, strengthens the relevance of defense analysis and experimentation projects, and diversifies the range of solutions considered for pursuit by the department.

The defense Adaptive Red Team/DART effort evolved into an expanded effort to assist CoComs with analysis and experimentation services tuned to their respective mission needs. DART met its objectives as a springboard to enfranchise CoComs with a voice in defense analysis and experimentation. Likewise, Technology Feeder Support (TFS) was a separate fund segment supporting CoCom internal analysis and experimentation technology needs. Both DART and TFS are now incorporated into the larger Joint Warfighting Program.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Direct Analysis Support for Combatant Command Support (DASCC)	4.935	6.331	5.435	

DASCC activities support CoComs by promoting the use of joint experimentation to address challenges specific to their theater or functional missions. It aims to reinvigorate CoCom staff capabilities to employ rigorous analysis and experimentation methodologies in support of specific mission assignments. DASCC provides a "trial and error" experiment to understand a concept or technology that addresses a specific CoCom challenge. DSCC activities are selected through an annual candidate nomination review and selection process.

FY 2008 Accomplishments:
DASCC continued to provide resources to CoComs for joint experimentation that addresses regional capability gaps and improves understanding of new technologies and concepts. Developed concepts for Joint Capabilities Technology Demonstration projects.
- USNORTHCOM. Planned and conducted a series of limited objective experiments to investigate capability gaps in the Homeland Defense & Civil Support Joint Operating Concept (JOC).
-USCENTCOM. Developed the Command's concept and experimentation roadmap allowing partnership and integration with USJFCOMs joint experimentation activities.
-USTRANSCOM. Planned and executed the Unified View Wargame in collaboration with USJFCOM.
- USPACOM. Developed an experimentation campaign plan that mapped capability gaps and identified potential technology solutions through insertions into field exercises including Terminal Fury, Northern Edge and Cobra Gold; initiated a Maritime Domain Awareness limited objective experiment (LOE) in coordination with USJFCOM.

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- USSOUTHCOM. Assisted in building partnership with Honduras through a crisis management experiment designed to address information sharing and collaboration in a natural disaster crisis situation; enabled the development of theater specific cooperative security engagement activities through a series of limited objective experiments. - USSTRATCOM. Provided analysis and validation of the Command's Operational Concepts and Integrated Priority Lists through wargame experiments on space, missile defense, information operations and deterrence; enabled participation in Nimble Titan Experiment that addressed policy level missile defense issues. *FY 2009 Plans:* FY09 Planned Output: Task 1 – Balancing Capabilities for Future Challenges. Using an "alternative futures" approach and the strategic planning framework developed during FY08 for defense strategy development and balancing military capabilities, further develop and test the framework in support of the next Quadrennial Defense Review (QDR) and to inform the plans of the new Administration. Task 2 – Training and Education. Develop evidence-based training and education solutions that will better enable joint forces to operate across the full range of military operations. Solutions will build on the theme that acquiring, refining, and sharing information and assimilating lessons from operations and training are fundamental joint actions. Develop an approach for capitalizing on new training methods and innovations in joint professional military education (JPME) to enable future joint forces to quickly adapt to new missions and challenges. Primary Sponsor: JS/J7 Task 3 – Support to Ongoing Operations. To learn from current wars while contributing to their success, provide on-site and on-call analytical support to joint and multi-national force commanders in Iraq and Afghanistan. Address campaign-level questions for which external expertise and perspective are needed. Task 4 – Broaden Irregular Warfare Capabilities. Develop concepts and capabilities to fill gaps identified by senior officials as critical and that joint force commanders (JFCs) have not been able to do. The immediate goal is to provide current JFCs and their staffs with capabilities by the end of FY09 in the form of illustrative Joint Campaign Plan annexes. More advanced capabilities for future JFCs will be identified in the form of DOTMLPF plus improvements for military forces and better leveraging the capabilities of				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
other government agencies (US, allied, host nation, international) and non-government organizations (NGOs). Task 5 – Future Adaptive EUCOM . Review the current operational environment that shapes US European Command responsibilities. Identify emerging pressures on NATO allies and develop concepts for countering those pressures. Develop a construct for an adaptive EUCOM headquarters framework by promoting the use of joint experimentation to address challenges specific to their theater or functional missions. Funds will be used to assess regional capability gaps and improve understanding of new technologies and concepts. Develop concepts for Joint Capabilities Technology Demonstration projects. *FY 2010 Plans:* FY 2010 Planned Output - Continue to provide resources to CoComs for joint experimentation that addresses regional capability gaps and improves understanding of new technologies and concepts. Develop concepts for Joint Capabilities Technology Demonstration projects.				
Joint Advanced Warfighting Program (JAWP) JAWP serves as a catalyst for innovation and change. This effort focuses on formulation and assessment of advanced concepts and capabilities, plus identifying enabling technologies and integration options for the Department. Annual JAWP activities are reviewed and approved by a Board of Directors chaired by USJFCOM, including Joint Staff (J7), and OUSD-Policy. *FY 2008 Accomplishments:* The JAWP continued support of full spectrum transformation objectives addressing irregular, catastrophic, and disruptive challenges. Funds were used to design, conduct, and support joint experimentation, joint concept development, and analysis of joint operations, with the intent to inform and effect resource allocation and acquisition. Efforts were made to align the department processes in ways that make them more responsive to the needs of CoComs and their subordinate forces. Topics analyzed in FY08 included: - Strategic Development. (Customer: OSD-Policy) Recommendations for making investment strategy choices by analyzing and contrasting future security environment challenges in order to inform the QDR.	5.700	5.700	5.700	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603727D8Z Joint Warfighting	**PROJECT NUMBER** P727

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Combatant Command Experimentation. (Customer: USNORTHCOM & USSOUTHCOM) Supported USSOUTHCOM & USNORTHCOM in designing and planning limited objective experiments to address capability gaps and identify solutions. - Balancing Capabilities. (Customer: Joint Staff and OSD-Policy) Developed and compared alternative paths for achieving balanced US military capabilities to meet future security challenges with emphasis on the integration of interagency and international capabilities in long-term plans. - Operationalizing Unified Action. (Customer: USSOUTHCOM and USAFRICOM) Building on previous work on interagency interplay in the Global War on Terror and its effect in the Horn of Africa, identified whole of government best practices for geographic CoComs. Use the effort to help inform the mission and organization of AFRICOM and SOUTHCOM. - Training and Education. (Customer: Joint Staff) Developed evidenced-based training and education solutions capitalizing on new training methods and innovations in education to enable adaptation to new missions. - Support to Multinational Force Iraq (Customer: Multi-National Force Iraq) continuing effort. Organized, conducted and report the results of expert panels, exploring issues identified by MNF-I. *FY 2009 Plans:* The JAWP will continue support of full spectrum transformation objectives addressing irregular, catastrophic, and disruptive challenges. It will design, conduct, and support joint experimentation, joint concept development, and analysis of joint operations, with the intent to inform and effect resource allocation and acquisition. It will continue efforts to align Department processes in ways that make them more responsive to the needs of CoComs and their subordinate forces. FY 2009 JAWP efforts – Balancing Capabilities for Future Challenges. Using an “alternative futures” approach and the strategic planning framework developed during FY08 for defense strategy development and balancing military capabilities, further develop and test the framework in support of the next Quadrennial Defense Review (QDR) and to inform the plans of the new Administration. – Training and Education. Develop evidence-based training and education solutions that will better enable joint forces to operate across the full range of military operations. Solutions will build on the theme that acquiring, refining, and sharing information and assimilating lessons from operations and				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603727D8Z Joint Warfighting	**PROJECT NUMBER** P727

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
training are fundamental joint actions. Develop an approach for capitalizing on new training methods and innovations in joint professional military education (JPME) to enable future joint forces to quickly adapt to new missions and challenges. – Support to Ongoing Operations. To learn from current wars while contributing to their success, provide on-site and on-call analytical support to joint and multi-national force commanders in Iraq and Afghanistan. Address campaign-level questions for which external expertise and perspective are needed. – Broaden Irregular Warfare Capabilities . Develop concepts and capabilities to fill gaps identified by senior officials as critical and that joint force commanders (JFCs) have not been able to do well. The immediate goal is to provide current JFCs and their staffs with capabilities by the end of FY09 in the form of illustrative Joint Campaign Plan annexes. More advanced capabilities for future JFCs will be identified in the form of DOTMLPF+ improvements for military forces and better leveraging the capabilities of other government agencies (US, allied, host nation, international) and NGOs. – Future Adaptive EUCOM . Review the current operational environment that shapes US European Command responsibilities. Identify emerging pressures on NATO allies and develop concepts for countering those pressures. Develop a construct for an adaptive EUCOM HQ command and control structure. *FY 2010 Plans:* FY 2010 Planned Output - The JAWP will continue support of full spectrum transformation objectives addressing irregular, catastrophic, and disruptive challenges. It will design, conduct, and support joint experimentation, joint concept development, and analysis of joint operations, with the intent to inform and effect resource allocation and acquisition. It will continue efforts to align department processes in ways that make them more responsive to the needs of CoComs and their subordinate forces and coalition partners.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603727D8Z Joint Warfighting	**PROJECT NUMBER** P727

E. Performance Metrics

Performance of Joint Experimentation systems is measured through metrics including (1) objective validation of enhanced CoCom 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, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603745D8Z Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	3.368	7.940	4.864						Continuing	Continuing
P745: Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	3.368	7.940	4.864						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Synthetic Aperture Radar (SAR) Coherent Change Detection (CCD) Initiative encompasses four phases to develop deployable systems capable of achieving SAR with real time Coherent Change Detection for tactical intelligence. The first phase, completed in FY2008, validated the utility of existing small SAR sensors for use as a CCD platform. CCD post processing was used to establish current SAR capabilities for change detection thresholds. Phase Two will demonstrate real-time CCD on a manned, SAR-equipped, platform. This real time enhancement will be capable of being retro fitted on existing manned SAR platforms. Phase Three will develop the engineering enhancements necessary to integrate a real time SAR CCD capability on a small unmanned airial vehicle (UAV). All necessary software will be developed during this phase. The fourth phase will extend the capability to an affordable small unmanned aircraft with a miniaturized SAR system. The goal is to develop a deployable system with a SAR sensor capable of achieving real time CCD on a small UAV to be tested by the tactical commander and at a cost of $500K per SAR CCD sensor package.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	3.469	7.984	4.953	
Current BES/President's Budget	3.368	7.940	4.864	
Total Adjustments	-0.101	-0.044	-0.089	
Congressional Program Reductions				
Congressional Rescissions		-0.044		
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-0.094			
Undistributed reductions	-0.007			
Internal realignment of funds			-0.025	
Other			-0.064	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603745D8Z Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)					**PROJECT NUMBER** P745	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P745: Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	3.368	7.940	4.864						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Synthetic Aperture Radar (SAR) Coherent Change Detection (CCD) Initiative encompasses four phases to develop deployable systems capable of achieving SAR with real time Coherent Change Detection for tactical intelligence. The first phase, completed in FY2008, validated the utility of existing small SAR sensors for use as a CCD platform. CCD post processing was used to establish current SAR capabilities for change detection thresholds. Phase Two will demonstrate real-time CCD on a manned, SAR-equipped, platform. This real time enhancement will be capable of being retro fitted on existing manned SAR platforms. Phase Three will develop the engineering enhancements necessary to integrate a real time SAR CCD capability on a small unmanned airial vehicle (UAV). All necessary software will be developed during this phase. The fourth phase will extend the capability to an affordable small unmanned aircraft with a miniaturized SAR system. The goal is to develop a deployable system with a SAR sensor capable of achieving real time CCD on a small UAV to be tested by the tactical commander and at a cost of $500K per SAR CCD sensor package.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Validate the Utility of SAR CCD	0.750	0.000	0.000	
SAR with real-time CCD will have the ability to detect the following activities with actual detection metrics that were determined and tested during Phase I: - Vehicle tracks due to a vehicle recently driving off-road, such as across a median strip, or adjacent to a paved road. - Human(s) having recently traversed a path on soft soil, underbrush or vegetation. - Detection of linear structures newly-emplaced, such as a small diameter pipe. - Ground displacement due to trenching or the movement of dirt along a path. - The addition or subtraction of a significant object visible to the sensor, covering a half square meter, or providing a significant change in radar cross section (reflectivity). - Ground displacement due to digging operations, or digging and soil replacement, or repaving operations, where the ground area of the displaced earth covers a square meter or more. - The displacement of guard barriers, or other objects, due to manual manipulation, or vehicle crashes.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603745D8Z Synthetic Aperture Radar (SAR) Coherent Change Detection (CDD)	**PROJECT NUMBER** P745

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Ground level subsidence due to underground excavation activities when the surface subsidence amounts to a few millimeters. The first phase validated the utility of small SAR sensors for use in CCD processing. Phase I also determined the current actual capabilities of CCD in tactical change detection. *FY 2008 Accomplishments:* Validated the utility of small SAR systems with CCD post processing for intelligence gathering.				
Demonstration of a manned platform system Phase 2 will accomplish the following: 1) Engineering of algorithms necessary to exploit complex Synthetic Aperture Radar (SAR) imagery. 2) Initial development of ground based software package to cue user to tactically significant changes in the area of interest. 3) Demonstration of near real time Synthetic Aperture Radar Coherent Change Detection (SAR CCD) capability on a manned aircraft. 4) Initial Concept of Operations (CONOPS) development. *FY 2008 Accomplishments:* Continued Phase I efforts, and began Phase II efforts. *FY 2009 Plans:* Demonstrate a real-time CCD capability on a manned SAR platform system with a radar and processing capability that can produce real-time SAR CCD, together with a design for a deployable objective system.	2.618	2.102	0.000	
Develop the engineering enhancements Phase 3 will accomplish the following: 1) Miniaturization of a Synthetic Aperture Radar Coherent Change Detection (SAR CCD) capability such that the sensor package is capable of deployment on a tactical sized UAV. 2) Further enhancements to the front-end software package user experience. 3) Refinement of Concept of Operations (CONOPS) initially developed in Phase 2.	0.000	5.838	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This phase will develop the necessary reduction in SAR component size necessary to facilitate integration of real-time CCD systems into a small UAV.				
Extend capability	0.000	0.000	4.864	
Phase 4 will accomplish the following: 1) A robust Concept of Operations (CONOPS). 2) A front-end software package with a rich user experience. 3) A near real time Synthetic Aperture Radar Coherent Change Detection (SAR CCD) capability integrated on to a tactical sized UAV with a sensor package cost of not more than $500 thousand. *FY 2010 Plans:* This phase of the program will integrate a SAR with real time CCD capability to a small UAV for $500 thousand per sensor package.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603750D8Z Advanced Concept Technology Demonstration (ACTD)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	1.552	1.194	0.000						Continuing	Continuing
P523: ACTD	1.552	1.194	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) initiated the Advanced Concept Technology Demonstration (ACTD) program with the purpose of demonstrating new, mature technologies in an operational environment and the goal of getting new technology into the hands of the warfighter as quickly as possible. Early successes included the Predator and Global Hawk unmanned aerial vehicles (UAVs). As of year end FY06, DoD has started 150 ACTDs, a total of 70 ACTDs were in process, and 22 had been returned to the technology base or terminated. However, no ACTD's have been started since FY 2006 with full transition to the JCTD program in FY 2007. By FY 2010 it is anticipated only three remaining ACTD's will not have completed the Miliatry Utilility Assessment (MUA). All funding in the ACTD program officially transferred to the JCTD program element (PE) in FY 2008, however, in 2008 and 2009 one congressional add was placed in the ACTD PE in each year.

The ACTD program demonstrated tremendous success in meeting urgent warfighter needs with 65 ACTDs contributing products that are/were employed in Operation Iraqi Freedom (OIF) and/or Operation Enduring Freedom (OEF). A non-exhaustive list of ACTDs deploying products to either OIF or OEF includes: Language and Speech Exploitation Resources (LASER), Expendable Unmanned Aerial Vehicle (XUAV), and the Joint Explosive Ordnance Disposal (JEOD) projects.

In FY 2006, the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C)) initiated a new business process, building on the success of the ACTD program, to support the Department's transformational reform of addressing future threats from a capabilities focus versus the classical threat based viewpoint. The revised ACTD approach is called the Joint Capability Technology Demonstration (JCTD) program, and is based on proven, positive aspects of the ACTD program with new modifications. The JCTD model specifically addresses congressional concerns and recommendations made by the General Accountability Office (GAO) regarding rapid development and transitioning of Combatant Commander (CoCom) relevant capabilities to the joint warfighter in a more cost effective, timely and efficient model. Aligning closely with the thrust of with the Joint Staff's Joint Integration and Development System (JCIDS), JCTDs take a more balanced project candidate identification approach, shifting the overall program's focus to identifying specific warfighter capabilities needs up front (requirements pull), and then finding technology or concepts to address these needs, while maintaining the historical ACTD approach, where new technology is introduced to the warfighter to solve existing operational shortfalls (technology push).

FY 2008 Accomplishments: DUSD (AS&C) shifted all funding to the JCTD program and maintains oversight of the JCTD program. No projects are currently funded in the ACTD PE 0603750D8Z in FY 2008 and there have not been any ACTD new starts since 2006. All remaining ACTDs will be funded through the JCTD program until completion. In FY 2008 there was one Congressional adjustment in FY 2008, the Power Dozer project. Funding was added to the ACTD for the project in the FY 2008 appropriation and remains the only funding resident in this PE.

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FY 2009 Output: One Congressional adjustment in FY 2009 was added, the Advanced Emergency Response Integrated Environment (AIRIE).

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	1.589	0.000		
Current BES/President's Budget	1.552	1.194		
Total Adjustments	-0.037	1.194		
Congressional Program Reductions				
Congressional Rescissions		-0.006		
Total Congressional Increases		1.200		
Total Reprogrammings				
SBIR/STTR Transfer	-0.034			
Balance attributed to undistributed reductions levied by legislative policies	-0.003			

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603750D8Z Advanced Concept Technology Demonstration (ACTD)					**PROJECT NUMBER** P523	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P523: ACTD	1.552	1.194	0.000						Continuing	Continuing

Note

In FY 2008 all ACTD funding transferred to the JCTD program. This completed the transtion to the JCTD model that began in the FY 2006 President's Budget. The new JCTD Program provides a "cradle to grave" path for transformational joint capabilities. The initial funding lines (program elements (PE)) are outlined in the table below. The PEs in the table (with the exception of the ACTD BA3 PE which will fully transfer to the JCTD BA3 PE in FY 2008) represent the JCTD model. Beginning in FY 2007 all new starts will be JCTD only. Refer to the specific Budget Exhibit for more details on each funding line.

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) initiated the Advanced Concept Technology Demonstration (ACTD) program in 1995 with the purpose of demonstrating new, mature technologies in an operational environment and the goal of getting new technology into the hands of the warfighter as quickly as possible. Early successes included the Predator and Global Hawk unmanned aerial vehicles (UAVs). As of year end FY 2007, DoD has started 160 ACTDs, a total of 57 ACTD/JCTDs were in process, and 22 had been returned to the technology base or terminated. However, no ACTD's have been started since FY 2006 with full transition to the JCTD program in FY 2007. By FY 2010 it is anticipated only three remaining ACTD's will not have completed the Miliatry Utilility Assessment (MUA). All funding in the ACTD program officially transferred to the JCTD program element (PE) in FY 2008, however, in 2008 and 2009 one congressional add was placed in the ACTD PE in each year.

The ACTD program demonstrated tremendous success in meeting urgent warfighter needs with 65 ACTDs contributing products that are/were employed in Operation Iraqi Freedom (OIF) and/or Operation Enduring Freedom (OEF). A non-exhaustive list of ACTDs deploying products to either OIF or OEF includes: Language and Speech Exploitation Resources (LASER), Expendable Unmanned Aerial Vehicle (XUAV), and the Joint Explosive Ordnance Disposal (JEOD) projects.

In FY 2006, the Deputy Undersecretary of Defense for Advanced Systems and Concepts (DUSD(AS&C)) initiated a new business process, building on the successful ACTD program, to support the Department's transformational reform of addressing future threats from a capabilities focus versus the classical threat based viewpoint. The revised ACTD approach is called the Joint Capability Technology Demonstration (JCTD) program, and is based on proven, positive aspects of the ACTD program with new modifications. The JCTD model specifically addresses congressional concerns and recommendations made by the General Accountability Office (GAO) regarding rapid development and transitioning of Combatant Commander (CoCom) relevant capabilities to the joint warfighter in a more cost effective, timely and efficient model. Aligning closely with the thrust of with the Joint Staff's Joint Integration and Development System (JCIDS), JCTDs take a more balanced project candidate identification approach, shifting the overall program's focus to identifying specific warfighter capabilities needs up front (requirements pull), and then finding technology or concepts to address these needs, while maintaining the historical ACTD approach, where new technology is introduced to the warfighter to solve existing operational shortfalls (technology push). FY 2006 was the first year of a three to five year transition period from the current ACTD to the improved JCTD program.

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However, in FY 2008 all ACTD funding has transferred to the JCTD program completing the transition more quickly than originally anticipated. Beginning in FY 2007 all new starts were JCTDs.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Power Dozer Side-Casting Technology Operational/Integration Evaluation	1.552	0.000	0.000	

The Power Dozer Side Casting Blade Technology is a mechanized earth moving system and is that of continuous loading and unloading of material. The Power Dozer Side Casting Blade Technology will be integrated on armored U.S. Military D8N and D7G dozers.

The Power Dozer Side Casting Blade Technology has successfully demonstrated the ability to breach/ clear assault lanes and wide area operations consisting of mines and heavy obstacles (tetrahedrons, hedgehogs, concrete jersey barriers, concrete cubes, concertina wire) on beach and inland approaches in a majority of soil types (from sand to extreme hardpack). The Power Dozer Side Casting Blade system consists of a standard cutting edge with teeth, a steel track laid on edge to form a belt around two vertical axis, two hydraulic motors directly driving two sprocket drives to propel the belt, powered by an auxiliary power unit (APU) mounted on the rear of the dozer.

The Power Dozer Side Casting Blade Technology provides power directly to the steel belt actively removing soil from the blade before it accumulates to the point the platform stops its forward motion. The steel belt rotates around two vertical axis that brings soil from the cutting edge to the belt, removing and casting it to the side of the vehicle's (platform) path. (Mines and obstacles are swept aside with the soil.) The speed at which the belt side-casts the material is matched to the host platform's forward speed so material is continuously unloaded. The belt is also reversible. The Power Dozer Side Casting Blade Technology has produced results not previously attained within the mechanical mine clearance arena.

In addition to mine and heavy obstacle clearance, the Power Dozer is capable of a 50 percent or greater enhanced productivity in earth moving tasks, protective berms, back filling, road building, side hill cuts, and general windrowing. The Power Dozer has the unique capability, as determined by mission requirements, of being able to be downsized or upsized to match various platforms

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Performed operational and integration evaluation on this recently demonstrated technology.				
Advanced Emergency Response Integrated Environment (AERIE) The AERIE will integrate force protection and installation infrastructures in the Pentagon, specifically the Integrated Emergency Operations Center (IEOC), enhancing situational awareness (SA) and improving response, addressing Homeland Security issues, Executive Order 133356 and 9/11 Commission recommendations. The methodology used in developing AERIE will allow the exchange of information in any interagency environment. This will significantly enhance the ability to communicate, coordinate, and relay information, while protecting sensitive data. AERIE will be used to provide the Pentagon Force Protection Agency insight into complex day-to-day activities. *FY 2009 Plans:* The AERIE will integrate force protection and installation infrastructures in the Pentagon, specifically the Integrated Emergency Operations Center (IEOC), enhancing situational awareness (SA) and improving response, addressing Homeland Security issues, Executive Order 133356 and 9/11 Commission recommendations. The methodology used in developing AERIE will allow the exchange of information in any interagency environment. This will significantly enhance the ability to communicate, coordinate, and relay information, while protecting sensitive data. AERIE will be used to provide the Pentagon Force Protection Agency insight into complex day-to-day activities.	0.000	1.194	0.000	

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C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
PE 0603648D8Z/Joint Capability Technology Demonstration (JCTD)	202.976	207.096	198.352						Continuing	Continuing
PE 0604648D8Z/Joint Capability Technology Demonstration (JCTD) Transition	2.866	13.487	18.577						Continuing	Continuing

D. Acquisition Strategy

The strategy for ACTDs has always been to focus on developing a transition path into a program of record or to establish a new program for those projects that show significant military utility in the demonstration phase. Promising ongoing ACTDs may receive transition funding from the JCTD Transition arm as the ACTD program completes. All ACTD funding will transfer to the JCTD program element in FY 2008. Beginning in FY 2007 all new starts were JCTD only. Program metrics:
- Capability Based: Greater CoCom influence looking at nearer term joint/coalition needs
- Provide Spiral Technologies - 25 percent will provide an operationally relevant product demonstration within 24 months of ID signature.
- Agile Demonstration - 75 percent complete final demonstration within three years of ID signature.
- OSD provide significantly more funding (often greater than 30 percent). In some exceptional cases a majority of project funding, especially during the first two years.
- JCTDs not necessarily tied to an exercise. Greater flexibility to establish military utility via operational "real-world" demonstration or specifically designed test/venue.
- 80 percent of JCTDs transition at least 50 percent of their products to sustainment.

E. Performance Metrics

FY2010
Strategic Goals Supported: Project Selection; Ability to spiral technologies; Adequately resourced projects; Complete a final demonstration; Number of successful capabilities transitioned.
Planned Performance Improvement / Requirement Goal: CoCom Capability; Spiral within 24 mos; Fund more than 30 percent; Demo within 3 years; Transition to Program of Record.
Planned Performance Metric / Methods of Measurement: 100; 25; 100; 75; 80 percent.

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The majority of funding from this Program Element is forwarded to the Services/Defense Agencies that execute the individual ACTD projects. DUSD(AS&C) maintains and provides overall programmatic oversight for the ACTD program, to include the individual ACTD projects. The JCTD/ACTD performance metrics center on how fast relevant joint and/or transformational technologies can be demonstrated and provided to the joint warfighter. These metrics are driven by the overall business process which includes six parts: (1) selection focus; (2) ability to spin-off spiral technologies; (3) time necessary to complete a final demonstration; (4) adequately resourced projects with appropriate oversight; (5) capability to complete an independent assessment of the technology; and (6) the number of successful capabilities that are actually transitioned to the warfighter. The table below defines these metrics and helps compare/contrast the current ACTD program with the new JCTD business process model.

A comparison of ACTD and JCTD metrics are:

1) Project Selection Focus

a. ACTD - Threat based: shared military service and CoCom influence.

b. JCTD - Capability Based: Greater CoCom influence looking at nearer term joint/coalition needs.

2) Spiral Technologies:

a. ACTD - No metric

b. JCTD - 25 percent will provide an operationally relevant product demonstration within 24 months of ID signature.

3) Final Demonstration Completed.

a. ACTD - 3 to 4 years after initiation.

b. JCTD - 75 percent of projects complete final demonstration within three years of ID signature.

4) Shared Funding and Viability of resources:

a. ACTD - OSD provides no more than 30 percent of the budgeted resources. Funding provided form many different program elements.

b. JCTD - OSD provides significantly more funding, greater than 30 percent in some cases a majority of projected funding, especially in the first two years.

5) Military Utility Assessment (MUA):

a. ACTD - MUA traditionally tied to a specific planned exercise for evaluation.

b. JCTD - JCTDs not necessarily tied to an exercise. Greater flexibility to establish military utility via operational "real-world" demonstration or specifically designed test/venue.

6) Transition of Technology:

a. ACTD - 70 percent of ACTDs transition at lease one product to sustainment.

b. JCTD - 80 percent of JCTDs transition at least 50 percent of their products to sustainment.

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	198.234	220.345	221.286						Continuing	Continuing
P507: High Performance Computing Modernization Program	198.234	220.345	221.286						Continuing	Continuing

Note

Other Program Funding Comment:

PE #090219D8Z Major Equipment OSD

In FY 2008 two centers were upgraded and funding exists in the FY 2009 Procurement budget to upgrade 2 centers and provide for initial mass storage investments.

The following dedicated high performance computing project investments were also provided upgrades with FY2008 procurement funding through an annual competitive process: Army Research Laboratory, Aberdeen, MD and the Air Force Research Laboratory, Rome, NY. Funding exists in the FY2009 procurement budget to provide for approximately four DHPCPIs.

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) High Performance Computing (HPC) Modernization Program (HPCMP) supports warfighter needs for technological superiority and military dominance on the battlefield by providing advanced computational services to U.S. weapons system scientists and engineers. Exploiting continuous HPC technology advances, the DoD research, development, test and evaluation (RDT&E) community is able to resolve critical scientific and engineering problems more quickly and with more precision. This feeds directly into the acquisition process by improving weapons system designs through an increased fundamental understanding of materials, aerodynamics, chemistry, fuels, acoustics, signal image recognition, electromagnetics, and other areas of basic and applied research as well as enabling advanced test and evaluation (T&E) environments that allow synthetic scene generation, automatic control systems and virtual test environments. HPC has been identified as a key enabling technology essential to achieving the DoD's science and technology (S&T) and T&E objectives. To emphasize the common missions and responsibilities of DoD high performance computing centers, the DoD undertook administrative actions to designate Major Shared Resources Centers (Air Force Research Laboratory, Army Research Laboratory, Engineering Research and Development Center, and Naval Oceanographic Office) together with the Maui High Performance Computing Center and the Arctic Region Supercomputing Center collectively as DoD Supercomputing Resource Centers (DSRCs). Two other congressionally established centers that provide supercomputing services to the DoD do not receive HPCMP support; the Army High Performance Computing Research Center, Minneapolis, MN and the Space and Missile Defense Command, Huntsville, AL receive Army operational support. The AHPCRC was retired

in FY2008. Additionally, funding for specialized programs is provided through dedicated HPC project investments (DHPCPIs). DHPCPIs support a one-time need and have no legacy within the HPCMP. DSRCs and DHPCPIs directly support the DoD S&T and T&E laboratories and test centers and are accessible to local and remote scientists and engineers via high-speed network access. In FY2009 and continuing into FY2010, significant investments will be made in mass data storage systems to replace systems reaching the end of their useful life. An integral part of the program is providing for the adaptation of broadband, widely used applications and algorithms to address S&T and T&E requirements, along with continued training of users in new system designs and concepts. The HPCMP pursues continuous interaction with the national HPC infrastructure, including academia, industry, and other government agencies to facilitate sharing of knowledge, tools, and expertise. HPCMP users average 5,000 scientists and engineers at approximately 180 locations (DoD laboratories, test centers, academic institutions and commercial businesses). The integrated HPCMP consists of DSRCs; the Defense Research and Engineering Network (DREN); and Software Application Support. DSRCs are responsible for as large a part of DoD`s S&T and T&E computational workload as feasible. DSRCs provide extensive capabilities to address user requirements for hardware, software, and programming environments. DHPCPIs augment the SRCs to form total HPCMP computational capability. DHPCPIs address critical HPC requirements that cannot be met at DSRCs, such as real-time, and near real-time computing requirements, and leverage significant HPC and mission expertise located at these remote sites. All elements of the HPCMP are interconnected with all S&T and T&E user sites via the DREN. The Software Application Support component develops critical common DoD applications programs that run efficiently on advanced HPC systems, supports technology transition activities with academic and commercial institutions, trains users, builds collaborative programming environments, and develops mechanisms to protect high value HPC application codes. The Computational Research and Engineering Acquisition Tools and Environments (CREATE) will produce supercomputer-based engineering design and test tools, improving the acquisition process for major weapons systems across the DoD. Modernization of DoD HPC capability and fulfillment of the program's vision and goals requires an on-going strategy that addresses all HPC aspects. While advancing the level of hardware performance is critical to success, the higher objective is enabling better scientific research, test and evaluation environments, and technology development for superior weapons, warfighting, and related support systems. Program goals are to acquire, deploy, operate and maintain best-value supercomputers; acquire, develop, deploy and support software applications and computational work environments that enable critical DoD research, development and test challenges to be analyzed and solved; acquire, deploy, operate and maintain a communications network that enables effective access to supercomputers and to distributed S&T/T&E computing environments; continuously educate the RDT&E workforce with the knowledge needed to employ computational modeling effectively and efficiently; and promote collaborative relationships among the DoD computational science community, the national computational science community and minority serving institutes.

As result of prior year funding reductions, HPCMP adjustments continued into FY2008. Reduced vendor response times and reliability metrics continued on maintenance contracts for selected large HPC systems leading to longer system downtime events and less system downtime accountability from maintenance service providers. Staff reductions lead to the loss of some qualified technical personnel; however, the award of a consolidated center support contract in FY2008 mitigated these losses. This action plus the earlier consolidation of help desk and scientific visualization functions worked to keep the adjustments relatively invisible to the customer from a service perspective. Existing contracts supporting the PET effort are being re-competed with a new award (s) made in FY2009.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	205.017	208.079	215.278	
Current BES/President's Budget	198.234	220.345	221.286	
Total Adjustments	-6.783	12.266	6.008	
Congressional Program Reductions				
Congressional Rescissions		-1.214		
Total Congressional Increases		13.480		
Total Reprogrammings	-2.297			
SBIR/STTR Transfer	-4.076			
Balance attributed to undistributed reductions levied by legislation	-0.410	0.000	0.000	
Program Budget Decision	0.000	0.000	8.923	
Other			-2.915	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P507, **Congressional Adjustments** Funding increases were provided for a NRL Supercomputing Information Prototype, Artic Regional Supercomputer, High Performance Computational Design of Novel Materials, and MHPCC.	0.000	13.480

Change Summary Explanation

A program budget decision provided additional funding to support full operations and maintenance at the Maui High Performance Computing Center and the Arctic Region Supercomputing Center.

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program					**PROJECT NUMBER** P507	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P507: High Performance Computing Modernization Program	198.234	220.345	221.286						Continuing	Continuing

Note

Other Program Funding Comment:

PE #090219D8Z Major Equipment OSD

In FY 2008 two centers were upgraded and funding exists in the FY 2009 Procurement budget to upgrade two centers and provide for initial mass storage investments.

The following dedicated high performance computing investments (DHPCIs) were also provided upgrades with FY2008 procurement funding through an annual competitive process: Army Research Laboratory, Aberdeen, MD and the Air Force Research Laboratory, Rome, NY. Funding exists in the FY2009 procurement budget to provide for approximately four DHPCPIs.

A. Mission Description and Budget Item Justification

The Department of Defense (DoD) High Performance Computing (HPC) Modernization Program supports the needs of the warfighter for technological superiority and military dominance on the battlefield by providing advanced computational services to U.S. weapons system scientists and engineers. By exploiting continuous advances in HPC technology, the defense research, development, test and evaluation (RDT&E) community is able to resolve critical scientific and engineering problems more quickly and with more precision. The results of these efforts feed directly into the acquisition process by improving weapons system designs through an increased fundamental understanding of materials, aerodynamics, chemistry, fuels, acoustics, signal image recognition, electromagnetics, and other areas of basic and applied research as well as enabling advanced test and evaluation environments that allow synthetic scene generation, automatic control systems and virtual test environments. As such, HPC has been identified as a key enabling technology essential to achieving the objectives of the DoD's science and technology (S&T) and test and evaluation (T&E) programs.

The program supports six DoD Supercomputing Resource Centers (DSRCs). Two other centers, established by congress do not receive programmed support through HPC Modernization Program funding, but provide supercomputing services to the DoD. The Army High Performance Computing Research Center (AHPCRC), Minneapolis, MN and the Space and Missile Defense Command, Huntsville, AL, receive their support for operations through the Army. The AHPCRC was retired in FY2008. Additionally, funding for specialized programs is provided through dedicated HPC project investments (DHPCPIs). DHPCPIs support a one-time need and have no legacy within the HPC Modernization Program Centers and DHPCPIs directly support the DoD S&T and T&E laboratories and test centers and are accessible

to local and remote scientists and engineers via high-speed network access. An integral part of the program is providing for the adaptation of broadband, widely used applications and algorithms to address S&T and T&E requirements, along with continued training of users as new system designs and concepts evolve. The program pursues continuous interaction with the national HPC infrastructure, including academia, industry, and other government agencies to facilitate the sharing of knowledge, tools, and expertise.

HPCMP users average 5,000 scientists and engineers at approximately 180 locations (DoD Laboratories and Test Centers, academic institutions and commercial businesses). The integrated HPC program consists of DSRCs; the DREN; and Software Application Support. DSRCs are responsible for as large a fraction of DoD`s S&T and T&E computational workload as feasible. DSRCs provide extensive capabilities to address user requirements for hardware, software, and programming environments. DHPCPIs augment the DSRCs to form the total HPC Modernization Program computational capability. DHPCPIs address critical HPC requirements that cannot be met at DSRCs, such as real-time, and near real-time computing requirements, and leverage significant HPC and mission expertise located at these remote sites. All elements of the HPC Modernization Program are interconnected with all S&T and T&E user sites via the DREN. Additionally, the Software Application Support component develops critical common DoD applications programs that run efficiently on advanced HPC systems, supports technology transition activities with academic and commercial institutions, trains users, builds collaborative programming environments, and develops mechanisms to protect high value HPC application codes.

True modernization of DoD`s HPC capability and fulfillment of the program's vision and goals requires an on-going program strategy that addresses all aspects of HPC. While advancing the level of hardware performance is critical to success, the higher objective is to enable better scientific research, test and evaluation environments, and technology development for superior weapons, warfighting, and related support systems. The Program goals are to (1) Acquire, deploy, operate and maintain best-value supercomputers; (2) Acquire, develop, deploy and support software applications and computational work environments that enable critical DoD research, development and test challenges to be analyzed and solved; (3) Acquire, deploy, operate and maintain a communications network that enables effective access to supercomputers and to distributed S&T/T&E computing environments; (4) Continuously educate the RDT&E workforce with the knowledge needed to employ computational modeling effectively and efficiently; and (5) Promote collaborative relationships among the DoD computational science community, the national computational science community and minority serving institutes.

The DREN provides wide area network (WAN) connectivity among the Department's S&T and T&E communities. The DREN is implemented through an Intersite Services Contract awarded to MCI (WORLDCOM) during FY 2002. DREN currently provides services to sites throughout the continental United States, Alaska, Hawaii, and can be extended overseas where necessary. Minimal access is DS-3 (45 Mbps) with potential high-end access of OC-768 (40 Gbps) over the next 7 years. Current site connectivity ranges from DS-3 to OC-48 (2 Gbps). A Secret DREN using common Secret systems high key with NSA certified Type-1 encryptors that can transport classified traffic at OC-3 (155 Mbps) has also been deployed. The HPC Modernization Program employs state-of-the-art WAN security and strong host and user security creating a defense-in-depth security architecture.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Department of Defense Supercomputing Resource Centers	107.264	108.423	109.191	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program	**PROJECT NUMBER** P507

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The program supports six DoD Supercomputing Resource Centers that are responsible for as large a fraction of DoD`s S&T and T&E computational workload as feasible. Dedicated HPC project investments (DHPCPIs) support a one-time need and have no legacy within the HPC Modernization Program. *FY 2008 Accomplishments:* To emphasize the common missions and responsibilities of DoD high performance computing centers, the DoD undertook administrative actions to designate the Major Shared Resources Centers (Air Force Research Laboratory, Army Research Laboratory, Engineering Research and Development Center, and Naval Oceanographic Office) together with the Maui High Performance Computing Center and the Arctic Region Supercomputing Center collectively as DoD Supercomputing Resource Centers (DSRCs). Also during FY2008, the program made other specialized systems investments that were sustained and supported by sponsoring Service organizations. As result of prior year funding reductions, HPCMP adjustments at DSRCs continued into FY2008. Reduced vendor response times and reliability metrics continued on maintenance contracts for selected large HPC systems leading to longer system downtime events and less system downtime accountability from maintenance service providers. Staff reductions lead to the loss of some qualified technical personnel; however, the award of a consolidated center support contract in FY2008 mitigated these losses. This action plus the earlier consolidation of help desk and scientific visualization functions worked to keep the adjustments relatively invisible to the customer from a service perspective. *FY 2009 Plans:* Since 1994, the program has sustained and regularly modernized HPC systems, storage, and scientific data analysis and visualization capabilities to fulfill a significant portion of the science and technology (S&T) and test and evaluation (T&E) community HPC requirements. Six DSRCs will be fully supported in FY2009. Another smaller center sustained and supported by the Army could continue to receive modernization funding through congressional adjustments to the program's annual budget request. Also, beginning in FY2009, the program will make significant investments in mass data storage systems to replace systems that will reach the end of their life cycle. These efforts are planned to continue into future years with no set completion date.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program	**PROJECT NUMBER** P507

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Since 1994, the program has sustained and regularly modernized HPC systems, storage, and scientific data analysis and visualization capabilities to fulfill a significant portion of the science and technology (S&T) and test and evaluation (T&E) community HPC requirements. Six DSRCs will be fully supported in FY2010. Another smaller center sustained and supported by the Army could continue to receive modernization funding through congressional adjustments to the program's annual budget request. Also, continuing into FY2010, the program will make significant investments in mass data storage systems to replace systems that will reach the end of their life cycle. These efforts are planned to continue into future years with no set completion date.				
Networking The Defense Research and Engineering Network (DREN) provides wide area network (WAN) connectivity among the Department's S&T and T&E communities. *FY 2008 Accomplishments:* The DREN provided high speed wide area network services to over 130 locations throughout the United States. DREN continued collaborative work with the federal networking community and standards associations. As result of prior year funding reductions the number site specific security assessments declined with more fully automated and remote security tools providing some augmentation. *FY 2009 Plans:* Network services to link all elements of the program will be provided by the DREN as well as operation of security systems and enhancements. Collaborative work with the federal networking community and standards associations will continue to assure that the DREN will remain compatible with future technology change. These efforts are planned to continue into future years with no set completion date. *FY 2010 Plans:* Network services to link all elements of the program will be provided by the DREN as well as operation of security systems and enhancements. Collaborative work with the federal networking community	28.833	31.443	29.589	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program	**PROJECT NUMBER** P507

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and standards associations will continue to assure that the DREN will remain compatible with future technology change. These efforts are planned to continue into future years with no set completion date.				
Software Applications	62.137	80.479	82.506	
Software Applications provide for the adaptation of broadband, widely used applications and algorithms to address S&T and T&E requirements, continued training of users as new system designs and concepts evolve, and continuous interaction with the national HPC infrastructure, including academia, industry, and other government agencies to facilitate the sharing of knowledge, tools, and expertise. *FY 2008 Accomplishments:* Development efforts in software programs continued to mature as other projects were completed, and others begun. The HPCMP through the Computational Research and Engineering Acquisition Tools and Environments (CREATE) initiative expanded HPC to the development of supercomputer-based engineering design and test tools to improve the acquisition process for major weapons systems across the Department. Software Engineering Institutes and portfolios developed shared scalable applications to exploit scalable HPC assets. An Academic Outreach Program was supported to encourage and support computational science in universities across the United States. The User Productivity Enhancement and Technology Transfer (PET) effort provided computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. Efforts were maintained to develop technologies and methodologies to protect and limit end-use of high performance computing applications software while minimizing the burden on authorized end-users. *FY 2009 Plans:* Computational Research and Engineering Acquisition Tools and Environments (CREATE) will continue development of supercomputer-based engineering design and test tools to improve the acquisition process for major weapons systems across the Department. Development efforts in software programs will continue to mature as other projects are completed, and others begun with a greater emphasis on engineering applications. Software Engineering Institutes and portfolios will continue to develop shared scalable applications to exploit scalable HPC assets. An Academic Outreach Program will continue to be				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program	**PROJECT NUMBER** P507

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
supported to encourage and support computational science in universities across the United States. The Programming Environments and Training (PET) effort will provide computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. Existing contracts supporting the PET effort will be re-competed with a new award (s) made in FY2009. On-going efforts will be maintained to develop technologies and methodologies to protect and limit end-use of high performance computing applications software while minimizing the burden on authorized end-users. These efforts are planned to continue into future years with no set completion date. *FY 2010 Plans:* Computational Research and Engineering Acquisition Tools and Environments (CREATE) will continue development of supercomputer-based engineering design and test tools to improve the acquisition process for major weapons systems across the Department. Development efforts in software programs will continue to mature as other projects are completed, and others begun with a greater emphasis on engineering applications. Software Engineering Institutes and portfolios will continue to develop shared scalable applications to exploit scalable HPC assets. An Academic Outreach Program will continue to be supported to encourage and support computational science in universities across the United States. The Programming Environments and Training (PET) effort will provide computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. On-going efforts will be maintained to develop technologies and methodologies to protect and limit end-use of high performance computing applications software while minimizing the burden on authorized end-users. These efforts are planned to continue into future years with no set completion date.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603755D8Z High Performance Computing Modernization Program	**PROJECT NUMBER** P507

C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
090219D8Z/Major Equipment OSD	50.784	52.410	53.105						Continuing	Continuing

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

Strategic Goals supported are as follows:

Defense Supercomputing Resource Centers - Method of Measurement: Habus (HPCMP standard measurement of computational performance)

FY2008: Existing Baseline – 522.4/ Planned Performance Improvement - Requirement Goal – 191.1/ Actual Performance Improvement – 453.0
FY2009: Existing Baseline – 975.4/ Planned Performance Improvement - Requirement Goal – 585.2
FY2010: Existing Baseline – 1560.6/ Planned Performance Improvement - Requirement Goal – 936.4

Networking - Method of Measurement: Gigabits per second

FY2008: Existing Baseline – 25.2/ Planned Performance Improvement - Requirement Goal – 1.0/ Requirement Goal/ Actual Performance Improvement – 5.4
FY2009: Existing Baseline – 30.6/ Planned Performance Improvement - Requirement Goal – 1.0
FY2010: Existing Baseline – 31.6/ Planned Performance Improvement - Requirement Goal – 1.0

Software Applications - Methods of Measurement: Customer Satisfaction on a 0-5 scale

FY2008: Existing Baseline – 4.2/ Planned Performance Improvement - Requirement Goal – 4.2/ Actual Performance Improvement – 4.4
FY2009: Existing Baseline – 4.2/ Planned Performance Improvement - Requirement Goal – 4.2
FY2010: Existing Baseline – 4.2/ Planned Performance Improvement - Requirement Goal – 4.2

Comment: All FY2008 actual performance metrics exceeded those planned.

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603781D8Z Software Engineering Institute (SEI)

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	24.719	31.072	31.298						Continuing	Continuing
P781: Software Engineering Institute (SEI)	21.698	28.056	23.761						Continuing	Continuing
P783: Software Producibility Initiative	3.021	3.016	7.537						Continuing	Continuing

A. Mission Description and Budget Item Justification

Software is key to meeting DoD's increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems.

Starting in 2009, Project 781 funds the technology development and transition activities of the Software Engineering Institute (SEI) at Carnegie Mellon University. The SEI is an R&D Laboratory Federally Funded Research and Development Center (FFRDC) sponsored by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. It was established in 1984 as an integral part of the DoD's software initiative to identify, evaluate, and transition high-leverage software engineering technologies and practices. The SEI fosters disciplined software engineering practices by DoD acquisition and life-cycle support programs and by the industrial base where the bulk of defense software is produced. The Institute works across government, industry, and academia to: (1) improve current software engineering activities from acquisition, technical, and management perspectives; (2) facilitate rapid, value-added transition of software engineering technology into practice; and (3) evaluate and calibrate emerging software engineering technologies to determine their potential for improving the evolution of software-intensive DoD systems.

The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs. FY 2005 focus areas are: Acquisition Practices for DoD Software-Intensive Systems (including pilot demonstrations of new technologies, dissemination of lessons learned, and provision of selected important services to the DoD acquisition community); Software Engineering Technical Practices (including survivable systems practices, software architecture technology, software component technology, performance-critical systems, and integration of software-intensive systems); and Software Engineering Management Practices [including personal and team software development processes, software engineering measurement and analysis, and Capability Maturity Model Integration (CMMI)].

P783 of this funding line includes the Software Produceability Initiative. The role of software in major Defense acquisition programs has been steadily increasing. Much of the mission functionality demanded from programs such as F/A-22, JSF, Future Combat System, and many others is embodied in large, complex software systems. Shortcomings in software development often lead to schedule slippage, cost growth, and mission compromises. These shortcomings can frequently be

traced to underpowered software development technologies not up to the task of developing the scale and complexity of software needed. Despite the large role of the commercial sector in advancing software technology, there are many key aspects of complex, distributed, robust systems crucial to DoD that are not being addressed directly by commercial technology efforts, as our experience over the past decade shows. The Software Produceability Initiative will focus on developing and transitioning more powerful and effective software development science, techniques, tools, and technologies to improve our ability to design, build, test and sustain software and software intensive systems.

This PE also includes support to find, evaluate, and test innovative technologies emerging from non-traditional sources. Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the Department of Defense (DoD) due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. These funds will be used to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. The facilitation of early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. In addition, it is important to understand how developments in commercial technology might impact existing DoD programs and systems. Equally important, new commercial technologies may require new DoD policies on the use of the technology or a modification to existing DoD policy.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	25.726	31.244	31.870	
Current BES/President's Budget	24.719	31.072	31.298	
Total Adjustments	-1.007	-0.172	-0.572	
Congressional Program Reductions				
Congressional Rescissions		-0.172		
Total Congressional Increases				
Total Reprogrammings	-0.250			
SBIR/STTR Transfer	-0.706			
Undistributed reductions	-0.051			
Internal realignment of funds			-0.160	
Other			-0.412	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603781D8Z Software Engineering Institute (SEI)					**PROJECT NUMBER** P781	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P781: Software Engineering Institute (SEI)	21.698	28.056	23.761						Continuing	Continuing

A. Mission Description and Budget Item Justification

Software Engineering Institute is key to meeting DoD's increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems.

The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs.

Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the Department of Defense (DoD) due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. DoD needs opportunities to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. Facilitating early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. Based on workshops and interactions with these companies and the DoD acquisition community in 2007 and 2008, the need emerged for funding to support rapid evaluation and test of these technologies that can't be accommodated by the normal acquisition program budget process.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Acquisition Practices for DoD Software Intensive Systems	2.443	2.426	2.567	
FY 2008 Accomplishments: * Helped more than 50 key acquisition programs achieve their objectives by working directly with them to apply new technologies and conduct experiments with maturing SEI products and services in real-world acquirer contexts.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Provided an on-site presence (as needed) to assist acquisition officials in the improvement of their software-intensive system-acquisition activities; for example, maintained on-site presence in Los Angeles, CA to provide direct support to the USAF Space and Missile Systems Center. * Captured knowledge from engagements with acquisition organizations, integrated it with lessons learned from similar work, and helped to impart that knowledge to the acquisition community. Accomplished this through means such as conferences, workshops, courses, briefings, technical reports, articles, advocacy, and participation in acquisition communities of practice. * Continued to provide liaison activity with external organizations and provided leadership roles within National Defense Industrial Association (NDIA), the International Council on Systems Engineering (INCOSE), the Program Management Institute (PMI), Practical Systems and Software Measurement (PSM), and the Office of the Secretary of Defense (OSD). * Developed and delivered Software Acquisition Survival Skills (SASS) course to help government students identify whether their programs are suffering from common failure patterns, construct "get well" plans to recover, and position their programs to avoid these problems if they are able to affect early lifecycle planning (over 45 offerings of the course to approximately 700 students). *FY 2009 Plans:* * Continue to provide direct support to key acquisition programs. * Pursue a balanced portfolio of program support and organizational support to aid in persistent organizational learning across multiple programs. * Establish an increased and persistent on-site presence augmented by a solid reach back capability in response to needs and requests from key acquisition programs and organizations. * Identify potential areas of focus to address common areas of concern across multiple programs. *FY 2010 Plans:* * Continue to help DoD and other government acquirers improve their ability to acquire, deploy, and sustain systems and capabilities. * Help identify opportunities for the SEI to create, apply, and amplify technologies that respond to customer needs.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Establish more on-site presence at key acquisition organizations to help high-visibility programs achieve their objectives in the areas of software systems engineering and technology adoption. * Identify potential areas of focus to address common areas of concern across multiple programs.				
Software Engineering Technical Practices	14.593	16.734	17.021	
FY 2008 Accomplishments: *Worked to establish the routine use of disciplined approaches to improve the survivability and resiliency of public and private organizations, and their networked systems by identifying and developing security management frameworks, evaluations, models, practices, and policy guidance that allow organizations to effectively and efficiently protect their mission-critical assets and systems, and focusing on the identification, analysis, and management of organizational, operational, and technical risks throughout the system development life cycle. *Provided security practices and information assurance training and education to equip personnel in the Department of Defense, federal civilian agencies, and the private sector with the knowledge, skills, and abilities required to improve the survivability of networked systems and computer network defense. *Developed methods and tools forming the backbone of government-wide situational awareness operations such as CENTAUR and EINSTEIN, supporting the US-CERT, JTF-GNO, and Service and Regional Command Computer Network Defense Service Providers. *Published a standard for representing computer security incident reports in the Internet Engineering Task Force (IETF). *Served as the hub of malicious code analysis activities across 25 federal government organizations through the CERT coordination center and its analysis methods, tools, and training. *Provided technical assistance to the United States Secret Service in the forensic analysis of seven terabytes of data. * Used the CERT Clustered Computing Analysis Platform and CERT developed forensic tools to support collaboration with law enforcement analysts and the U.S. District Attorney's Office. * Provided online training in areas of Information Security and Assurance, Computer Forensics, and Incident Response through the SEI's Virtual Training Environment (VTE) to 96,000 users across government and industry, including to Service members deployed in Iraq, Kuwait, Afghanistan, Okinawa, Korea, and other forward locations.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
* Provided direct support to numerous DoD programs through the SEI's Survivable Enterprise Management group, including to Airborne Networks, Future Combat Systems (FCS), Army Research Office (ARO), Counterintelligence Field Activity (CIFA), and the National and Personnel Security Research Center (PERSEREC). * Completed case codebook, data dictionary, and decision rules for Counterintelligence Field Activity (CIFA) through the "Insider Threat Project: Modeling Human Behavior in Cyberspace" project. * Guided transition to service-oriented architectures using the SMART methodology at Army CERDEC C2D and Air Force 653rd wing. * Participated in delivering final report of the OSD Biometrics task force. * Developed a convergence plan for service oriented architecture initiatives for the Office of the Army Chief Information Officer. * Provided recommendations on dealing effectively with real-time, safety-critical, embedded (RTSCE) systems issues for the Army Strategic Software Improvement Program (ASSIP). * Presented assurance cases and reliability lessons at ESC workshop. * Provided technical support to Air Force, Army, and Navy programs using Software Architecture Technology (SAT) techniques, methods and guidelines. * Applied pilot-ready version of the Mission Thread Workshop to the Navy's CG(X) program. *FY 2009 Plans:* * Transition vulnerability analysis and malicious code analysis tools and techniques to response teams with national responsibility. * Expand pilot opportunities, transition resiliency engineering concepts through coursework, and by performing independent assessments of organizational competency for select customers. * Work with pilot organizations to quantify relative insider threat levels. * Develop proof-of-concept prototypes for a targeted language environment. * Transition security practices, tools, and methodologies to the DoD information assurance workforce through the Virtual Training Environment. * Increase collaboration with the DoD in support of efforts to secure the defense industrial base (DIB) and global supply chain.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
* Expand on the work initiated with the Air Force Cyber Command Task Force to transition computer network operations, risk management, and force development capabilities to AFCYBER. * Mature and transition emerging technologies generated by work in network-centric operations and systems of systems, addressing how to operate effectively in an environment that requires large-scale distributed collaboration, is constrained by acquisition practices. * Enhance the SOA research agenda and expand a community of interest around it. * Apply SoS Navigator methods to address new problems of distributed collaboration, and refine best practices in the acquisition of systems of systems. * Apply assessment and improvement instruments, collect data from these experiences, and develop a comprehensive reference model for architecture competence. * Investigate the applicability of system and SoS architecture evaluation methods to enterprise architecture, and develop a body of anecdotal evidence supporting their effectiveness. *FY 2010 Plans:* * Develop training courses and workshops for the Resiliency Engineering Framework. * Develop training standards, curriculum material, and courses in software assurance. * Develop tools and training to support the DoD cyber warfare mission. * Develop functional extraction-based tools for correctness verification and component composition. * Codify System of System (SoS) Navigator tools and methods and develop tutorials. * Extend Service Migration and Reuse Technique (SMART) and develop additional guidelines and methods to support more phases of the SOA-based systems development process. * Develop repeatable workshops on acquisition in a system-of-systems context. * Evolve the Service Oriented Architecture research agenda to include broad sets of stakeholders and keep it current with all external research progress. * Develop Model Based Engineering (MBE) life-cycle practices and two courses on architectural modeling using MBE and MBE practices. * Develop practices for managing the success potential of distributed, multi-enterprise programs and projects. * Refine and elaborate the economic and design foundations for architecture evolution and their implications for using architecture-centric practices throughout the lifecycle.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Investigate the role of architecture in Ultra Large Scale (ULS) System evolution including ongoing research in mechanism design and computational emergence. * Refine and elaborate a comprehensive reference model for architecture competence and write case studies about assessing and improving architecture competence. * Write case studies about the synergistic use of the mission thread workshop, SoS and system architecture evaluation. * Write a case study about combined use of assurance cases and certifiable code analysis to a medical device challenge problem. * Apply Predictable Assembly from Certifiable Code (PACC) technologies to networked systems, with emphasis on mobile ad hoc sensor nets. * Publish programmer guidelines, idioms, patterns, and techniques for automated analysis of code and generation of objective evidence of program behavior. * Investigate the impact of multi-core architecture and parallel application on predictability				
Software Engineering Management Practices *FY 2008 Accomplishments:* *Maintained the CMMI Product Suite by creating, maintaining, and appropriately updating or enhancing products, including guidance for small organizations and appraisal and process improvement courseware. *Completed the transition from CMMI v1.1 to v1.2; All course offerings and appraisals, delivered by either the SEI or its Partners, are with version 1.2 of the CMMI for Development model. *Continued the transition of CMMI into practice: more than 94,000 individuals have been officially trained in CMMI; more than 3,000 organizations have been officially appraised against CMMI. * Published a book titled CMMI and Six Sigma: Partners in Process Improvement. * Documented and published the CMMI Architecture * Released CMMI for Acquisition, version 1.2, (CMMI-ACQ, v1.2); Published CMMI for Acquisition Primer, v1.2. * Created and offered one-day upgrade training for the CMMI-ACQ, v1.2 model *Established SCAMPI A and ARC-compliant B&C appraisals system for the CMMI-ACQ v1.2 model * Provided additional guidance on process development for special organizational interests (e.g., safety) through new business rules on how to develop and use a "CMMI Focus Topic"	4.662	3.943	4.173	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Continued to focus on the value and integrity of CMMI results. * Developed the Lead Appraiser Quality Program. * Implemented certification for High Maturity Lead Appraisers program. * Put in place new policies and requirements for reporting, accepting, and publishing SCAMPI appraisals. * Published clarifying communications on CMMI Level 4-5 interpretation and implementations. * Instituted increased system of scrutiny for appraisal submissions and audited all maturity/capability levels 4 and 5 appraisals. * Fielded- "Understanding CMMI High Maturity Practices" course. *Continued to expand the SEI Partner Network to leverage CMMI transition around the world; there are currently 339 licensed SEI Partners for CMMI-DEV and 34 for CMMI-ACQ. *The SEI completed the development and began delivery of the second course in its series adapting Six Sigma methods to software and systems engineering. Designing Products and Processes using Six Sigma (DPPSS) has been delivered as a public offering and onsite including deliveries to high maturity Air Force organizations. * Developed Instructor Training for DPPSS. *Delivered several tutorials on CMMI and Lean Six Sigma to Army organizations as part of the Army Strategic Software Improvement Program. * Supported Hill AFB adoption of SEI six sigma courses. * Conducted two offerings in the CMMI High Maturity Measurement & Analysis Workshops series. *Created new licensing opportunities for the Improving Process Performance using Six Sigma course, which aims to increase transition to the broader community. * Published "A Study Into the Use of DAES-SARS Information for Forecasting Program Performance," "Requirements and Their Impact Downstream" and "Can You Trust Your Data?" * Provided survey design and analytical expertise to NDIA-sponsored study on system engineering effectiveness; results of this work are documented in "A Survey of Systems Engineering Effectiveness - Initial Results." *FY 2009 Plans:* * Improve the efficiency of the CMMI Product Suite's usage in order to increase its utility in all sizes of organizations.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
* Maximize the interoperability of multiple CMMI constellations-CMMI for Development and CMMI for Acquisition-due to the blend of activities seen in many DoD and other agencies. * Continue to improve the value and integrity of CMMI appraisals *Support a series of user workshops to define the requirements for a CMMI Version 1.3. * Continue to improve the understanding of and guidance on High Maturity. * Full certification of SCAMPI Lead Appraisers. * Release new packaging of the Intermediate Concepts of CMMI to improve understanding and implementations of CMMI levels 2 and 3 * Increase auditing of Level 2 and 3 appraisals. * Release the CMMI for Services constellation. * Apply Team Software Process-Integrated (TSP-I) in field trials at NAVAIR and Bechtel-Bettis. * Provide a CMMI-Six Sigma certification program. * Pilot the Measurement & Analysis Infrastructure Diagnostic (MAID) method. * Continue to develop the Performance Benchmarking Project. * Conduct a technology refresh that will make the SEIR more valuable to the SEI and community and more efficient to operate. *FY 2010 Plans:* *Continue stewardship functions for CMMI. * Respond to CMMI Steering Group direction on new activities to support user requirements including additional constellations, improvements to appraisals' effectiveness and efficiency, and improved user understandings and implementation. * Release CMMI v1.3, resolving incompatibilities across the existing constellations and improving the definitions of and guidance on the high maturity level Process Areas. *Create specific "how to" methodology or implementation guidance for Six Sigma tools, business case analyses, various computations of expected benefits or returns (e.g., ROI), and other techniques and tools.				
Technology from Non-Traditional Sources	0.000	4.953	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: - Program plans for a new start with FY 2009 funding were developed to find, evaluate, and experiment with innovative technologies emerging from non-traditional sources. - Competitively recruit 10-15 of the countries best venture capitalists to serve as consultants on innovative technologies technologies emerging from non-traditional sources. - Conduct five workshops/roundtables etc with active participation from the operator and requirements communities to discover private sector technologies (information, electronics, devices) that deliver capability at optimum cost to the warfighter. - Complete a Navy workshop at SPAWAR to define Navy needs for emerging innovative IT/electronic technologies. - Establish a focused effort at NRL to identify and conduct critical experimentation on revolutionary products emerging from non-traditional sources. Effort transferred to Project 783 in 2010 and beyond.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Strategic Goals Supported: Improve ability to acquire systems; Value to taxpayer; Value to taxpayer.
Existing Baseline: Value to Customer; Contract Billings; Performance and Cost review.
Planned Performance Improvement / Requirement Goal: Average rating of 4 or higher; All costs are allowable and allocable; Less than 5% of programs unsatisfied.
Actual Performance Improvement: 4.33
Actual Performance Metric / Methods of Measurement: 1-5

Comment:
A&S Performance Measures for Products

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Customer Supported
Activity
Performance Requirement
Performance Measure
Method of Measurement
SEI Admin Agent
Ensure value to PWS Customers
Average rating of 4 or higher
Level of overall performance
Paper or electronic survey of customers
SEI Admin Agent
Contract Billings
All costs are allowable and allocable
Contract costs
Approval by ACO
Performance and Cost Review
Less than 5% of solicited programs
Number of unsatisfactory ratings
DCAA conducts periodic review
For SIS: PM
Ensure valuable assistance to programs' success
Provide actionable and effective recommendations to PMs
Percentage of recommendations implemented
Customer Satisfaction Survey to PMs
Cost avoidance realized as result of implementing recommendations
Interview w/PM as follow-up to Survey

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603781D8Z Software Engineering Institute (SEI)					**PROJECT NUMBER** P783	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P783: Software Producibility Initiative	3.021	3.016	7.537						Continuing	Continuing

A. Mission Description and Budget Item Justification

The role of the Software Producibility in major Defense acquisition programs has been steadily increasing. Much of the mission functionality demanded from programs such as F/A-22, JSF, Future Combat System, and many others is embodied in large, complex software systems. Shortcomings in software development often lead to schedule slippage, cost growth, and mission compromises. These shortcomings can frequently be traced to underpowered software development technologies not up to the task of developing the scale and complexity of software needed. Despite the large role of the commercial sector in advancing software technology, there are many key aspects of complex, distributed, robust systems crucial to DoD that are not being addressed directly by commercial technology efforts, as our experience over the past decade shows.

This initiative will conduct integrated program of research from basic through dem-val that advances the state-of-the art in produceability of software for DoD systems, particularly those systems characterized by high complexity, need for robustness, information assurance, real-time performance, and physical distribution. Research and transition efforts will pursue technical goals to (1) meet and ensure mission-critical requirements; (2) control complexities; (3) enable system evolution; (4) ensure seamless interoperability; and (5) model behavior and performance.

Invest in promising software technologies involving (1) specification of complex requirements; (2) correct-by-construction software development; (3) composable and customizable frameworks; (4) high-confidence system software and middleware; (5) system architectures for network-centric environments; (6) technologies for testing, verification, and validation, and (7) modeling and metrics. Additionally, software and systems development researchers would serve as experts to advise ongoing acquisition programs.

Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the Department of Defense (DoD) due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. DoD needs opportunities to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. Facilitating early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. Based on workshops and interactions with these companies and the DoD acquisition community in 2007 and 2008, the need emerged for funding to support rapid evaluation and test of these technologies that can't be accommodated by the normal acquisition program budget process.

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Software Producibility	3.021	3.016	2.966	

This initiative will conduct integrated program of research from basic through dem-val that advances the state-of-the art in produceability of software for DoD systems, particularly those systems characterized by high complexity, need for robustness, information assurance, real-time performance, and physical distribution. Research and transition efforts will pursue technical goals to (1) meet and ensure mission-critical requirements; (2) control complexities; (3) enable system evolution; (4) ensure seamless interoperability; and (5) model behavior and performance.

Invest in promising software technologies involving (1) specification of complex requirements; (2) correct-by-construction software development; (3) composable and customizable frameworks; (4) high-confidence system software and middleware; (5) system architectures for network-centric environments; (6) technologies for testing, verification, and validation, and (7) modeling and metrics. Additionally, software and systems development researchers would serve as experts to advise ongoing acquisition programs.

FY 2008 Accomplishments:
Awarded the Software and Systems Test Track. Awarded effort to United Technologies Research Corporation to investigate application of mathematical tools from DARPA DYNARUM program to networked systems to predict formerly unanticipated emergent systems behaviors. Released initial BAA for a Software and Systems Stockroom to improve industrial base performance by providing focused technical capabilities (reuse libraries, abstraction toolsets populated with domain-specific knowledge). Monitored ongoing efforts with Vanderbilt U and UC Berkeley.

FY 2009 Plans:
Continue execution of the Software and Systems Test Track. Complete 2007 research efforts in developing technologies for interoperable systems of systems. Mature business plan for gov/industry co-investment in research, select an implementation approach, initiate the necessary agreements. Mature the SIS Producibility Technology Roadmap, get community consensus on priorities and measures. Promote and monitor useage of the Systems and Software Test Track to provide a place (possibly

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
virtual and not a single physical location) for experimental verification of Software-Intensive Systems Producibility technologies due to their novelty and the potential complexity of the underlying theories. The experimental platforms will incorporate software technology to instrument, monitor and test large-scale applications. The experimental platform research included subtasks to conduct large-scale coordination experiments, and developed methods and tools for evaluating aggregate performance of applications. This environment provided a full range of collaborative technology challenges, run-time platforms and applications, experiments, evaluations, and demonstrations. A Common infrastructure will enable control and data flow between both kinds of application components for a distributed environment. The open experimentation environment provided the fundamental reference architecture and underpinnings helping researchers to develop and test their designs as well as facilitates transition of promising technologies into production use. Initiated a research topic in interoperability to address software techniques to improve system of system interoperability. Review previously awarded contracts to develop and transition new methodologies, tools, technologies and techniques that improve DoDs ability to acquire software for large, net-centric warfighting systems of systems. Release a BAA with subsequent award for community based technology efforts such as reuseable SW library or populating existing toolsets with domain-specific knowledge for application to a DoD-specific need such as military avionics, communications, or platform control. *FY 2010 Plans:* Initiate 2-3 new efforts based on mature technology roadmap. Sustain experimentation on the Software and Systems Test Track. Continue DoD-specific community based technology effort awarded in 2008.				
Technology from Non-Traditional Sources Transferred from P781 in FY2010 and beyond *FY 2010 Plans:* - Conduct five workshops/roundtables etc with active participation from the operator and requirements communities to discover private sector technologies that deliver capability at optimum cost to the warfighter. - Complete evaluation of emerging technologies that deliver capability for SOCOM.	0.000	0.000	4.571	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Develop tracking system to monitor transfer of emerging technologies from non-traditional sources into DoD. - Develop and issue a report on the transfer of emerging technologies into the DoD.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Strategic Goals Supported: Improve ability to acquire systems; Value to taxpayer; Value to taxpayer.
Existing Baseline: Value to Customer; Contract Billings; Performance and Cost review.
Planned Performance Improvement / Requirement Goal: Average rating of 4 or higher; All costs are allowable and allocable; Less than 5% of programs unsatisfied.
Actual Performance Improvement: 4.33
Actual Performance Metric / Methods of Measurement: 1-5

Comment:
A&S Performance Measures for Products
Customer Supported
Activity
Performance Requirement
Performance Measure
Method of Measurement
SEI Admin Agent
Ensure value to PWS Customers
Average rating of 4 or higher
Level of overall performance
Paper or electronic survey of customers
SEI Admin Agent

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Contract Billings
All costs are allowable and allocable
Contract costs
Approval by ACO
Performance and Cost Review
Less than 5% of solicited programs
Number of unsatisfactory ratings
DCAA conducts periodic review
For SIS: PM
Ensure valuable assistance to programs' success
Provide actionable and effective recommendations to PMs
Percentage of recommendations implemented
Customer Satisfaction Survey to PMs
Cost avoidance realized as result of implementing recommendations
Interview w/PM as follow-up to Survey

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COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	109.493	106.795	107.984						Continuing	Continuing
P826: Quick Reaction Fund	32.413	30.340	29.217						Continuing	Continuing
P828: Rapid Reaction Fund	48.911	49.620	49.406						Continuing	Continuing
P829: Technology Transition Initiative (TTI)	28.169	26.835	29.361						Continuing	Continuing

A. Mission Description and Budget Item Justification

Quick Reaction Special Projects Program supports three separate projects that provide rapid funding to expedite new development and transition of new technologies to the warfighter. The projects that are part of the QRSP are the Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and the Rapid Reaction Fund (RRF). QRSP provides the flexibility to respond to emergent DoD issues and address technology surprises and needs within the years of execution outside the two-year budget cycle. The TTI program is mandated by Congress and receives high congressional interest.

The Quick Reaction Fund (QRF) program is focused on responding to emergent needs during the execution years that take advantage of technology breakthroughs in rapidly evolving technologies. Examples of the types of projects that are envisioned include: accelerating promising research that will enable transformation; or will fill critical gaps in DoD acquisition programs and will last no longer than 12 months; or maturation of technologies critically needed by combatant commanders for operations. Typically these projects are on the technology maturity scale where an idea or technology opportunity is proven and demonstrated.

Authorized by Title 10 and Section 215 of the FY2003 Defense Authorization Act, the Technology Transition Initiative (TTI) facilitates the rapid transition of new technologies from the DoD science and technology (S&T) base into DoD acquisition programs. The program addresses the funding gaps that exist between the time a mature technology is demonstrated and the time it can be funded and procured for use in an intended weapons system or operational capability for the warfighter.

In FY 2010, RRTO's objectives are to leverage the DoD science and technology base and those of the other Federal Departments; stimulate interagency coordination and cooperation; accelerate the fielding of capabilities and concepts to counter emerging threats; and provide feedback to the S&T community to guide long term developmental strategies. The task force works to anticipate adversaries' exploitation of technology, including available and advanced capabilities. Additionally, the task force works to exploit technology developed outside of DoD in the commercial sector, in academia and international arenas as well as anticipate adversary's application of available and advanced technology. The average length of a RRTO program falls within an 8-12 month range in order to more effectively aid the warfighter.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	113.244	113.924	114.565	
Current BES/President's Budget	109.493	106.795	107.984	
Total Adjustments	-3.751	-7.129	-6.581	
Congressional Program Reductions		-9.339		
Congressional Rescissions		-0.590		
Total Congressional Increases		2.800		
Total Reprogrammings	-0.511			
SBIR/STTR Transfer	-3.013			
Other	-0.227		-6.581	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P828, **Augmented Reality to enhance Special Warfare Domain**		1.600
Project: P826, **Unmanned Aerial Vehicles**		1.200

Exhibit R-2a, PBR 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P826: Quick Reaction Fund	32.413	30.340	29.217						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Quick Reaction Fund (QRF) provides flexibility to respond to emergent warfighter needs in the execution years. It takes advantage of technology breakthroughs in rapidly evolving technologies with expected completion within 6 to 12 months.

Quick Reaction Fund - A data call was released on July 28, 2008 requesting proposals in response to emergent operational needs and to capitalize on technologies. To assist in prioritizing the proposals, the call letter requested the Service and Agency Science and Technology Executives and the DDR&E principles to submit their top ten proposals. A notification on the DDR&E website was also posted so there was another avenue to submit proposals. Candidate proposals were focused in the areas that have the potential to address disruptive, catastrophic and irregular technologies. Each proposal addressed the description of the technology/concept, description of any demonstration testing required, description of technical, funding, and schedule risk, proposed executing Service/Agency and User. The proposals were reviewed for technical and warfighter relevance. Projects awarded with FY 2009 funding include Mini Scanning Mirror Fabrication and Test, Rover Compatible SmartCapture Video for Close Air Support, Vigilant Sentinel - An EO/NIR based Missile Warning System, AOA Probe Torque Tester, MAV System for Enhanced Support of Cave Detection, Attack Planning, BDA, and Mission Planning, et.al. Below is more in-depth discussion of the projects funded. Because these programs are one time efforts, there are currently no plans to fund them in other years. However, for the overall QRF program, FY 2010 and 2011 plans are to continue to respond to critical operational needs and technology opportunities.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
436L Cargo Net Redesign initiative	0.305	0.000	0.000	
It is desired to replace the existing three piece net with a single piece net to improve efficiency in cargo pallet build up time and personnel requirements. *FY 2008 Accomplishments:* A single piece net was certified to meet air lift needs in place of the existing three piece net. The one piece net creates efficiencies by reducing overall pallet build up time and personnel requirements (one person vs. current two person minimum). Introduction of a competitive product reduces acquisition program risk by avoiding the sole source situation.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Agile Robotics for Logistics The project objective is to create an agile robotic platform that can locate, grasp, lift, and manipulate cargo objects (pallets, boxes, etc.) under command of one or more human operators. *FY 2008 Accomplishments:* An increasingly capable agile mobile manipulation platform was developed that can locate, grasp, lift, carry, manipulate, place, and release objects of interest potentially including pallets, boxes, and individual items or objects, all under text command of one or more humans.	2.500	0.000	0.000	
Automated Imagery Ship Detection for Open Ocean and Littorals This project aims to develop an image analysis tool to automatically detect ships in overhead satellite imagery. *FY 2008 Accomplishments:* An image analyst tool to automatically detect ships in overhead satellite imagery was developed.	0.640	0.000	0.000	
Counter Sniper Protection System Turret The objective of this project is to develop a turret-based system to provide sniper protection and counter engagement capability. *FY 2008 Accomplishments:* The project developed a turret-based system that provides sniper protection and counter engagement capability. This project was funded via a congressional add.	1.120	0.000	0.000	
Demonstration of Holistic Approach to Battlefield Power Utilizing Hybrid Powered Energy Sources and Power Management The objective of this project is to produce highly fuel efficient, optimized, and operationally agile power systems that operate as a stand alone system or part of a battlefield power architecture addressing the full spectrum of power needs.	0.921	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: The performance of an advanced power generation and management system was demonstrated using both tactical vehicles for mobile and on-the-move applications and in a fixed frame (without wheels) for stable operations. The power architecture demonstrated was based on the use of an energy source and energy storage devices coupled with solid state conversion of output power to produce highly fuel efficient, optimized, and operationally agile power systems that operate as a stand alone system or part of a battlefield power architecture addressing the full spectrum of power needs. This architecture is known as the Tactical Intelligent Power System (TIPS).				
Fiber-Laser-Array Holder for 100-kW-Class Fiber Laser The objective of this project is to develop and demonstrate a high-energy-laser (HEL) compatible, large-channel-count fiber-laser array holder with micron alignment precision. *FY 2008 Accomplishments:* This project developed and demonstrated a high-energy-laser (HEL) compatible, large-channel-count fiber-laser array holder with micron alignment precision. This eliminates the need for cumbersome individual fiber positioning controls and will allow the outputs of 100 kW fiber lasers to be aggregated in a compact, robust, fieldable package. This allows tactical fiber-laser HELs to be fielded on mobile platforms.	1.000	0.000	0.000	
High Performance Propeller Coating Assessment The objective of this project is to evaluate the effectiveness of two coating processes in reducing friction drag and improving cavitation inception and erosion prevention. These coatings offer significant savings in fuel consumption, reduced logistics costs, and improved service life. *FY 2008 Accomplishments:* This project evaluated the effectiveness of two coating processes in reducing friction drag and improving cavitation inception and erosion prevention. These coatings offer significant savings in fuel consumption, reduced logistics costs, and improved service life. These efforts provide the data necessary to support full-scale testing of the coatings on operational platforms.	1.950	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Low Signature Portable Fuel Cell Power Systems The objective of this project is to develop a methanol based fuel cell power source of 250W to serve as a portable battery charger for existing re-chargeable batteries or a silent auxiliary power unit. *FY 2008 Accomplishments:* The project developed and demonstrated a methanol fueled 250W power source - a portable, highly efficient energy source that can serve as a battery charger for existing re-chargeable batteries or a silent auxiliary power unit. This is a shared development effort with CERDEC.	2.020	0.000	0.000	
Miniature ISR Sensor Technology (MIST) Tagging, Tracking, and Locating (TTL) devices using satellite communications links are bulky. The objective of this project is to reduce the volume of currently bulky tagging, tracking, and locating devices that utilize satellite communication links. *FY 2008 Accomplishments:* The MIST Project has developed the technology to reduce the volume of such a TTL device by several orders of magnitude.	1.997	0.000	0.000	
MX-15DLI -- Operational Airborne Turret Prototype Providing Day/Night Video for Targeting, Tracking, Tagging, and ISR from Aircraft The objective of this project is to develop an airborne turret system that uses laser illumination to make high quality video at long ranges. *FY 2008 Accomplishments:* This project assisted in development of an airborne turret system which uses laser illumination to make high quality video at long ranges during dark-of-night. This video is simultaneous with high resolution FLIR and LGW imaging-designation.	1.450	0.000	0.000	
Predictive Awareness and Network-Centric Analysis for Collaborative Intelligence Assessment (PANACIA)	0.725	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
USCENTAF JUON requested a common fusion analytical tool to help intel operators process overwhelming volumes of info and multiple situational awareness pictures, which limited collaboration capabilities. In response PANACIA is being developed to provide an automated multi-source intelligence correlation and fusion capability. *FY 2008 Accomplishments:* USCENTAF JUON requested a common fusion analytical tool to help intel operators process overwhelming volumes of information and multiple situational awareness pictures, which limited collaboration capabilities. In response PANACIA was developed to provide an automated multi-source intelligence correlation and fusion capability and was installed in an operational intelligence center.				
Project Anubis - Tactical MAV for Time-Sensitive Fleeting Targets The objective of this project is to address the need for a Micro-Air Vehicle (MAV) that can engage maneuvering high-value targets. *FY 2008 Accomplishments:* This project developed a Micro-Air Vehicle (MAV) with innovative seeker/tracking sensor algorithms that can engage maneuvering high-value targets.	1.750	0.000	0.000	
Rapid Runway Repair Jumpstart This project aims to develop the capability to rapidly assess and repair damage to airfield pavements after attack . *FY 2008 Accomplishments:* This project developed the capability to rapidly assess and repair damage to airfield pavements after attack to resume operations of both heavy and fighter aircraft and to sustain those operations over time. This provides an enhanced capability to meet current requirements.	2.500	0.000	0.000	
Single Card Solution (SCS)-based National Tactical Receiver (SNTR) Module	0.200	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The SCS is a fully software-defined radio and can be programmed to generate the waveforms and crypto needed to receive the Integrated Broadcast System (IBS), which provides timely tactical intelligence information to warfighters. Legacy IBS receivers are not suitable for use by individuals. *FY 2008 Accomplishments:* This project resulted in completion of a Software Development Unit (SDU) for the SCS to allow proof of concept for the SNTR, and accelerated availability by one year. This makes receipt of the IBS by the individual in the battlespace practical, with major implications for mission effectiveness, fratricide prevention, and personnel recovery. This was a FY06 project funded with split FY06/FY07/FY08 funds.				
Semi-Autonomous Robotic Manipulation and Sensing This project addresses the need by warfighters and first responders for a readily available robotic system with multi-mission tools and sensors for both ISR and IED defeat. *FY 2008 Accomplishments:* This project provided the joint service warfighter and first responders with a readily available robotic system with multi-mission modular tools / sensors for ISR and IED threat prevention, detection, and neutralization. This project was funded via a congressional add.	1.200	0.000	0.000	
TALON LOTUS II The objective of this project is to verify the feasibility of using an alternative sensor that overcomes many of the disadvantages of conventional sensors for detecting and tracking small air-breathing targets. *FY 2008 Accomplishments:* This projected verified the feasibility of an alternative sensor that overcomes virtually all of the disadvantages of conventional sensors for detecting and tracking small air-breathing targets. The specifics are classified.	0.300	0.000	0.000	
Threat Airframe Model Development The objective of this project is to develop a model of a specific classified threat airframe.	0.750	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2008 Accomplishments: The project developed a model of a threat airframe. The specifics are classified.				
University of Alaska Unmanned Aircraft Systems Experimentation, Test, and Evaluation The objective of this project is to continue testing and evaluation of unmanned aerial system operations in northern latitudes and harsh environments. *FY 2008 Accomplishments:* This effort tested and evaluated unmanned aerial system (UAS) operations in northern latitudes and harsh environments. This testing and evaluation included scientific, homeland security and DOD missions. This project was funded via a congressional add. *FY 2009 Plans:* The project will continue the test and evaluation of unmanned aerial system operations in northern latitudes and harsh environments, with a focus on applications in scientific, homeland security, and DoD missions. This project has been funded for an additional year via a congressional add.	1.600	1.200	0.000	
US Government Band-based, Secure, Robust Tactical Wireless The objective of this project is to address limitations in performance and survivability of MANET via an alternative mobile "MESH" wireless system. *FY 2008 Accomplishments:* This project developed an alternate IEEE 802.11 mobile "MESH" wireless protocol-based system for a mobile, wireless battlespace. This system addressed limitations in performance and survivability of MANET.	1.396	0.000	0.000	
USV Application to an Indigenous Vessel: Eduardian/Junk/Dhow The expeditious application of a USV control system onto an indigenous non-military vessel by a forward insertion team provides an outstanding disguise, a familiar vessel in local waters. The objective of this	1.000	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
effort is to develop an USV operating system that can be rapidly installed on a foreign vessel and remotely operated. *FY 2008 Accomplishments:* This project developed an USV operating control system application that allows non-technical personnel to rapidly install and remotely operate it on a foreign vessel.				
Reality Vision Mobile Closed Mode Prototype The objective of this project is to develop a customized version of a COTS product for intelligence-gathering applications. *FY 2008 Accomplishments:* This project developed a customized version of the COTS RealityVision™ product that leverages the core functionality of the current product in a manner specifically designed for intelligence-gathering applications.	1.610	0.000	0.000	
Small Craft Integrated Common Picture This project is funded via a congressional add managed under the Rapid Reaction Fund (RRF) program. *FY 2008 Accomplishments:* Funds applies to project via a congressional add managed under the Rapid Reaction Fund (RRF) program.	0.800	0.000	0.000	
Joint Air Defense Operations Center (JADOC) NCR—Cooperative Engagement Capability (CEC) Track Fusion Improvement Initiative (TFII) Phase 2 The objective of this effort is to demonstrate the suitability of introducing CEC quality data to the National Capital Region (NCR) Integrated Air Defense System (IADS). Because of CEC's multi-sensor architecture and the available base of military sensors already configured for CEC use, it offers an attractive means of enhancing and extending the NCR IADS and the Southwest Asia air surveillance picture to include	0.475	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
multiple, wide-area feeds, including maritime approach data from naval surface and air units operating ashore or at sea. *FY 2008 Accomplishments:* This project demonstrated the suitability and performance benefits of introducing CEC track quality data and fused sensor environment to the JADOC battle management system.				
Extended Reachback Communications This project addresses the need for an increased bandwidth data path from UAVs to ground stations, with an objective of data rate of 350+ Mbps. *FY 2008 Accomplishments:* This project provided a one-way communications link from a UAV to the ground in the 36 - 39.5 GHz frequency band at data rates from 350 Mbps to 1 Gbps. This capability will allow for high data rate exfiltration without the commitment of satellite assets or manned aircraft to accomplish the mission.	1.079	0.000	0.000	
EMC2/IEF Boron Fusion The objective of this project is to continue research towards a proven, validated, and reviewed and approved final design basis for engineering development and construction of full-scale clean nuclear power plants. Boron/hydrogen reactions are radiation-free and non-hazardous and well-suited to direct electric power applications to Navy propulsion, as well as to modest scale ground power plants/systems, able to be run without fossil fuels. Such power plants would revolutionize DoD power systems applications and requirements. *FY 2008 Accomplishments:* This project continued research towards a proven, validated, and reviewed and approved final design basis for engineering development and construction of full-scale clean nuclear power plants. Payoff would be elimination of the need for fossil fueled plants. Boron/hydrogen reactions are radiation-free and non-hazardous and well-suited to direct electric power applications to Navy propulsion, as well as to	0.300	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
modest scale ground power plants/systems, able to be run without fossil fuels. Such power plants would revolutionize DoD power systems applications and requirements.				
Scalable High Power GaN T/R Switch Development This projecets objective is to dramatically reduce the cost and complexity, and lowering the insertion loss in high power radars (e.g., AMDR or G/ATOR) by enabling a higher level of integration through the replacement of expensive circulators and isolators in Transmit/Receive (T/R) modules with over ten times smaller and less costly high power solid state Gallium Nitride (GaN) T/R switches. *FY 2008 Accomplishments:* This projet created a less costly, high power, solid state Gallium Nitride (GaN) T/R switch that can replace expensive circulators and isolators in Transmit/Receive modules.	2.825	0.000	0.000	
Mini Scanning Mirror Fabrication and Test This effort will refine, fabricate, integrate and test a new laser beam pointing device called the Mini Scanning Mirror (MSM) as a candidate component in the next generation of Infrared Countermeasures (IRCM) system. *FY 2009 Plans:* This effort refined, fabricated, integrated and tested a new laser beam pointing device called the Mini Scanning Mirror (MSM) as a component in the next generation of Infrared Countermeasures (IRCM) system.	0.000	1.750	0.000	
Sensor Fusion Improvement Initiative (SFII) Phase 3 The purpose of this project is to evaluate the suitability and performance benefits of introducing Naval Cooperative Engagement Capability (CEC) track quality data and fused sensor environment into the NORAD/NORTHCOM (N/NC) sensor grid.	0.000	0.675	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This project evaluates the suitability and performance benefits of introducing Naval Cooperative Engagement Capability (CEC) track quality data and fused sensor environment into the NORAD/ NORTHCOM (N/NC) sensor grid. This approach will be demonstrated to offer several advantages: • Reliable long range detection of small, low-flying targets • Extensible architecture that can be expanded as required and as new sensors emerge • High resolution tracking and fire control ID mechanisms • Potential for expanded early warning of high risk tracks approaching the NCR and other littoral areas throughout N/NC • The technology used for integration of CEC data into N/NC is also applicable to theater missions using systems such as the Battlespace Command and Control Center (BC3) used in CENTCOM/AFCENT.				
Project DogStar Command and Control/Communications Systems Protect (C2/CS Protect) The project uses various Computer Network Operations (CNO), Information Technology (IT), Parametric tools and skills, network defense, to operationalize and link the visualization of blue network status, adversarial behavior, vulnerabilities, battle space situational awareness and mitigation options. Project includes a new capability to monitor network status and provide shared situational awareness of network attacks, identify and address threats locally by isolation of affected systems and positive control of network traffic flow. *FY 2009 Plans:* This project will conduct controlled experiments with identical data sets that demonstrated a significantly improved ability to detect and counter network attacks from real world and Department of Defense “Red Teams” during designated exercises in comparison to existing GOTS/COTS tools.	0.000	2.400	0.000	
Rover Compatible SmartCapture Video for Close Air Support This project provids a compact, high-quality digital video/voice/data capture and encoder device (called MilSmartCapture), which is Rover compatible, for Close Air Support. This will permit rapid dissemination of sensor video to commanders and warfighters for battlefield decision-making.	0.000	0.197	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: 20 military grade devices will be delivered.				
Vigilant Sentinel - An EO/NIR based Missile Warning System The Vigilant Sentinel initiative focused on exploiting the spectral signature of the plume of a Man-Portable Air Defense System (MANPADS) to detect its launch, its location, and to initiate a countermeasure in a timely manner. *FY 2009 Plans:* This project will design, produce, and test a prototype Vigilant Sentinel missile warning system.	0.000	0.950	0.000	
Standoff Terahertz Human Threat Identification The goal of this effort is the development of a THz Ladar sensor capable of detecting trace explosives primarily on human hair, clothing, packaging and other personal effects at standoff ranges of 20 meters. *FY 2009 Plans:* This effort will develop a THz Ladar sensor capable of detecting trace explosives primarily on human hair, clothing, packaging and other personal effects at standoff ranges of 20 meters.	0.000	2.300	0.000	
AOA Probe Torque Tester The objective of this project is to fabricate and demonstrate the utility of a prototype, on-aircraft tester for the angle-of-attack (AOA) probe for the F/A-18 E/F. *FY 2009 Plans:* This project will fabricat and demonstrated the utility of a prototype, on-aircraft tester for the angle-of-attack (AOA) probe for the F/A-18 E/F.	0.000	0.162	0.000	
MATRIX System Black Dart VI Demonstration	0.000	0.750	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The objective of this project is the systematic and measurable demonstration and performance assessment of acquisition, tracking and pointing technologies, and algorithms leading to a directed energy defeat of area defense threats such as Man Portable Air Defense Systems (MANPADS), mortars, rockets, artillery and Unmanned Aerial Vehicles (UAV). *FY 2009 Plans:* This effort will produce multi-function / multi-threat area protection with speed of light engagement, increased area coverage, reduced collateral damage, and persistent engagement.				
MAV System for Enhanced Support of Cave Detection, Attack Planning, BDA, and Mission Planning The program objective is to demonstrate enhanced capabilities for detecting and characterizing (for improved attack planning) cave targets in rough terrain using photogrammetric models built with imagery obtained from a commercial off the shelf (COTS) small unmanned aircraft system's (sUAS) micro air vehicle (MAV). *FY 2009 Plans:* The program will demonstrate enhanced capabilities for detecting and characterizing (for improved attack planning) cave targets in rough terrain using photogrammetric models built with imagery obtained from a commercial off the shelf (COTS) small unmanned aircraft system's (sUAS) micro air vehicle (MAV).	0.000	1.909	0.000	
Remaining FY 2009 Funding Some FY 2009 funds remain uncommitted to allow coverage of new starts. Funding decisions are made throughout the execution years in response to emergent COCOM and service requirements, new threats, and new opportunities. *FY 2009 Plans:* Some FY 2009 funds remain uncommitted to allow coverage of new starts. Funding decisions are made throughout the execution years in response to emergent COCOM and service requirements, new threats, and new opportunities.	0.000	18.047	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Quick Reaction Fund Plans	0.000	0.000	29.217	
Quick Reaction Fund plans for FY 2010				
FY 2010 Plans: The FY 2010 data call for new start projects will be fielded in the fourth quarter of FY 2009.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

QRF/RRF: Program completion and success will be monitored against program schedule and deliverable stated in the proposals.

TTI: In FY 2008, initiated the new start of 14 projects and concluded the activities on many continuing projects with the result of 9 technologies transitioning to the warfighter.

In FY 2009, initiate the new start of 7 projects and conclude the activities on many continuing projects with the result of at least 13 technologies transitioning to the warfighter.

In FY 2010, initiate the new start of 12 projects per year and conclude the activities on many continuing projects with the results of 11 technologies per year transitioning to the warfighter.

RRF: In FY 2008/FY 2009/FY 2010RRF investment decisions are made during the execution years in response to combatant commander requirements and new threats/new opportunities.

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P828: Rapid Reaction Fund	48.911	49.620	49.406						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Quick Reaction Special Projects Program(QRSP) (Program Element 0603826D8Z) supports three separate projects that provide rapid funding to expedite the development and transition of new technologies to the warfighter: The projects that are part of the QRSP are the Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and Rapid Reaction Fund (RRF). The Defense Acquisition Challenge Program (DACP), formerly part of QRSP, was transferred in FY 2005 and out years to PE0604051D8Z.

RRF is fully executed through the Combating Terrorism Technology Task Force, recently re-designated as the Rapid Reaction Technology Office (RRTO). The RRTO was stood up to provide rapid response to operations in Iraq, Afghanistan and other theaters in support of the of the Oversea Contingency Operations (OCO) and to accelerate the transition of high-potential science and technology projects into operationally useful products in the execution years. In FY 2005/2006, RRTO leveraged the DoD science and technology base and those of the other Federal Departments; stimulated interagency coordination and cooperation; accelerated the fielding of capabilities and concepts to counter emerging threats; and provided feedback to the S&T community to guide long term developmental strategies. The task force anticipated adversaries' exploitation of technology, including available and advanced capabilities. Additionally, the task force exploited technology developed outside of DoD in the commercial sector, in academia and internationally; as well as anticipated adversary's application of available and advanced technology. In FY 2007 RRTO built upon previous experience and pursued projects in: counter cover, concealment and deception in a counter insurgency environment; explored methods and approaches of persistent surveillance stimulation for counterinsurgency; developed alternate power sources for sensors and systems; and expanded human, social and cultural knowledge. In FY 2008 RRTO focused its projects in the areas of small unit situation awareness, program synchronization, non-kinetic operations, strategic communications, biometrics and forensic applications, persistent surveillance infrastructure, maritime surveillance, small unit dispersed capabilities within specific geographic areas, cross organization/agency sharing , network war concept development and strategic multi-layer assessments.

RRF investment decisions are made during the execution years in response to combatant commander, service and other government organizations requirements and new threats/new opportunities. The average length of a RRTO project falls within an 8-12 month range in order to more effectively aid the warfighter.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Imaging Ladar for Rotorcraft Brownout	1.350	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The objective of this project is to develop and flight test preprocessing electronics designed to prevent the imaging system from triggering on returns from dust. *FY 2008 Accomplishments:* This project fabricated and delivered two analog systems and flight test support at Yuma in simulated dustout conditions.				
Ground-based Sensor/Satellite System This project utilizes Ground-based sensors to measure atmospheric conditions for correlation with satellite data. The satellite imagery is then corrected to provide better resolution of colleted imagery. *FY 2008 Accomplishments:* This project provided imagery and meteorological data that was collected and passed to interested organizations.	0.600	0.000	0.000	
Target-of-Opportunity Foliage Penetration LIDAR (TOO-FOPEN) This project worked on critical steps towards providing a high-resolution lidar FOPEN capability by leveraging leading edge technology from others. *FY 2008 Accomplishments:* This project incoporated a team that evaluated flights for intelligence, field testing and system feasibility studies and demonstrated a Concept of Operations (CONOPS). Several aspects of the CONOPS were demonstrated and evaluated including flight and ground processing operations.	1.500	0.000	0.000	
Common Operational Research Environment (CORE) Program This project leverages analytical technologies to educate the officer corps on how to apply theoretical concepts to the problems of terrorism and irregular warfare.	0.782	0.255	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This project developed the Advanced Analytics course and delivered classroom instruction so that students at the Naval Postgraduate School have the opportunity to apply theoretical concepts and analysis to historical data on insurgencies and terrorist campaigns. *FY 2009 Plans:* Continue with the Advanced Analytics course.				
Persistent Surveillance Challenges This effort will identify challenge problems and example behaviors of interest to DoD and Intelligence Community partners. The challenge problems will focus research and development of advanced techniques and algorithms on DoD/IC priorities. Sensor data and multi-source information will be collected and packaged into exportable files for the broader research community and contractors proposing new capabilities. *FY 2008 Accomplishments:* This project utlized challenge problem scenarios and they were posted to Intelipedia. Exportable challenge problem data packages were provided.	0.430	0.000	0.000	
Ground Moving Target Indicator (GMTI) radar and a passive Electro-Optical (EO) Handover This effort is to develope algorithms to quantify the performance of handover of vehicle tracks between a Ground Moving Target Indicator (GMTI) radar and a passive Electro-Optical (EO) video sensor. *FY 2008 Accomplishments:* This effort has provided algorithms for and quantified the performance of handover of vehicle tracks between a Ground Moving Target Indicator (GMTI) radar and a passive Electro-Optical (EO) video sensor.	10.500	0.000	0.000	
Small Craft Integrated Common Operational Picture - SCICOP	0.880	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
SCICOP provides integrated navigation (charts, sensors) and tactical (mission planning, force tracking) capabilities for operators of small high speed craft. SCICOP is net-centric and supports connectivity between numerous operational craft, unmanned systems and sensor and command headquarters. *FY 2008 Accomplishments:* This project rapidly inserted and demonstrated the SCICOP capability in Riverine and Special Operations craft.				
Project Mirador Project Mirador was the first operational evaluation of Unmanned Surface Vehicles (USV) in direct support of Counter Drug (CD) operations. The objective of Project Mirador was to determine whether USVs can be used as a force multiplier in the Detection and Monitoring (D&M) role. *FY 2008 Accomplishments:* Southern Command (SOUTHCOM) conducted a three-week shore based deployment in FY08 in support of transit zone littoral CD operations using an unmanned surface vehicle (USV) at 2-3 locations in the Dominican Republic.	0.300	0.000	0.000	
Fuel Cell Powered Long Endurance Expendable Unmanned Aircraft System for Intelligence, Surveillance, and Reconnaissance This work will provide an enabling capability for the warfighter and Special Operations Forces (SOF) by providing a longer endurance power source and providing an inexpensive, long endurance UAS for ISR. *FY 2008 Accomplishments:* Efforts have fully automating the operation of the fuel cell propulsion system and the overall operation of a UAS. This phase also continued the development of the wing unfolding hardware and software as well as developed the tube launch system.	0.500	0.000	0.000	
Rapid Reaction Technology Office Testing in Yuma Proving Grounds (YPG)	1.850	1.470	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Rapid reaction joint services testing support is provided 2 weeks out of every 8 weeks at YPG. These test periods are the opportunity for technologies without enough funding for testing to show their capabilities in a real world setting. The Joint Experimental Range Complex (JERC) was constructed for the purpose of supporting these tests. RRTO supported testing at the JERC allows the under/un- funded new technologies a chance to rapidly demonstrate their capabilities and ultimately be utilized in the war against terrorism. *FY 2008 Accomplishments:* Reports were written on each demonstration and archived on the Anti-Terrorism Enterprise Portal (ATEP) web page for all community members with interest to access. Successful demonstrations were presented to appropriate organizations to take the technology to the next stage and ultimately transition. Unsuccessful but promising technologies are invited back when improvements are completed. *FY 2009 Plans:* Reports will be written on each demonstration and archived on the Anti-Terrorism Enterprise Portal (ATEP) web page for all community members with interest to access. Successful demonstrations will be presented to appropriate organizations to take the technology to the next stage and ultimately transition. Unsuccessful but promising technologies will be invited back when improvements are completed.				
Dynamic Analysis of Stability, Support, Transition, and Reconstruction Operations (SSTRO) SSTRO builds a framework capable of capturing the complexities and interdepencies of SSTRO as a subset of Irregular Warfare (IW). *FY 2008 Accomplishments:* SSTRO provided an analytic tool that is capable of providing insights for force structure and enables the formation of analytic baselines for the IW scenarios in the Defense Planning Scenarios (DPS).	0.454	0.000	0.000	
Extreme Medallion - Phase II	0.900	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Extreme Medallion Phase II provided the ability to identify unique or missing linkages by expanding technology to other government agencies, giving them a highly reliable tool to provide actionable information to decision-makers and provide expertise to identify implications of importance. *FY 2008 Accomplishments:* Extreme Medallion Phase II demonstrated an innovative approach to combine recent successes in forecasting and network mapping with the advanced functional sequencing of the adversary's business practices to help map a specific critical network function of interest.				
Video Exploitation Phase II Video Exploitation Phase II was to develop a video exploitation cell that is intended to provide timely and accurate geo-locational information to the customer and their deployed elements. *FY 2008 Accomplishments:* This project developed a functioning prototype video exploitation technology integration cell to identify physical locations from the content of terrorist and/or insurgent videos.	0.772	0.000	0.000	
Multiple Fuel Engines The objective of this effort is to meet both the USSOCOM and Air Force requirements for a Non-Gasoline Burning Outboard Engine (NBOE. *FY 2008 Accomplishments:* Developed a 30HP multifuel engine that meets both the USSOCOM and Air Force requirements.	0.647	0.000	0.000	
ARVCOP The ARVCOP objective was to enhance core capabilities to meet the emerging requirements of Riverine craft operators and special operations warfighters. A key element of this is expansion to include additional unmanned platforms and sensors.	0.900	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: ARVCOP has provided integrated navigation (charts, sensors) and tactical (mission planning, force tracking) capability for operators in a variety of craft.				
CVE SCOPE This project launched a one year pilot project to provide Support to a Common Operating Picture (SCOPe) in order to assist USG efforts to counter violent extremism (CVE). *FY 2008 Accomplishments:* CVE-SCOPe tracked and linked the interaction of strategic level thematic/policy guidance, raw media mining and analysis, product development, audience analysis, intelligence collection and analysis, and dissemination components, and fostered information sharing between these elements.	1.803	0.000	0.000	
Biometric Information Technology Evaluation: BITE The BITE project puts together a current baseline that can be used for biometrics systems analysis, gap analysis and prioritization of future investments. *FY 2008 Accomplishments:* The baseline included a comprehensive collection of available information on the deployed biometric systems, how they are currently used, how different employment concepts alter performance and development of a process oriented flow diagram of these individual deployments as an overall system.	0.675	0.000	0.000	
Cooperative Security Pilot The Cooperative Security Pilot project consolidated and aligned methodologies and processes for the assessment, planning and monitoring of complex conflict environments, integrating the capabilities of all instruments of national power, for use by USG departments and agencies, partner nations, International and Non-Government Organizations (IO and NGO), and coalition partners.	1.450	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: The Cooperative Security Pilot project provided a common framework for assessments, planning and metrics; integrated tools for assessment, planning and metrics; and trip reports from in-theater demonstrations.				
Technology Initiatives for Improving Non-Kinetic Capabilities for Irregular Warfare - Phase II This project identifies four technology initiatives that could significantly improve non-kinetic capabilities for irregular warfare. *FY 2008 Accomplishments:* The study team held a workshop with subject matter experts to address the challenge of identifying capabilities for countering corruption.. The team drafted a set of desired capabilities and potentially relevant technologies, and made recommendations regarding a technology-search process.	0.285	0.000	0.000	
Phoenix AFRICOM The objective of this project is to perform systems engineering, architecture development and software prototyping in the development of the data collection, processing, modeling, analysis, and dissemination with specific regard to assisting USAFRICOM in the establishment of a high end analytic cell. *FY 2008 Accomplishments:* tDeveloped a technologically advanced core analytic capability within AFRICOM to produce non-traditional geo-temporal analysis products.	0.250	0.000	0.000	
Victims Documentary The goal of the Victims Documentary project is to help create a suppression sphere around areas of ideologically-based extremism and terrorism.	0.229	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This project developed a script and storyboard for the preproduction of a documentary film and a fully produced documentary and distribution plan.				
Persistent Sensor Integration Demonstration PSID provides reliable deployment of a secure network for sensor data transmission and communications between riverine force components and local commanders. *FY 2008 Accomplishments:* This project demonstrated improvements in ISR and force protection for riverine forces during patrol, insertion and extraction operations.	0.500	0.750	0.000	
Hostile Fire Detection The HFDS project allows sensor capabilities for detection and false alarm rejection to be validated in multiple field environments against multiple weapons classes. *FY 2008 Accomplishments:* This project performed field testing of the hostile fire weapons system (HFDS).	0.070	0.000	0.000	
ISR-SAT This combined effort provides an improved time critical exploitation and targeting decision process, resulting in actionable intelligence against High Value Targets (HVT). *FY 2008 Accomplishments:* This project combined a proven, fully developed and validated geo-location technology with an existing integrated situational awareness platform using National Technical Means (NTM) data and mapping.	0.477	0.000	0.000	
Explosives Detection - Phase II	0.879	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
This project developes a handheld, stand-off or Remote Explosives Detector (RED) thermal imaging system *FY 2008 Accomplishments:* This project delivered a transportable prototype of a standoff explosives detection system.				
Counter Corruption The objective of the Counter Corruption project is to identify technology initiatives that could enable improved capabilities for countering corruption in host-nation police forces thus contributing to the establishment of security and the rule of law in unstable nations. *FY 2008 Accomplishments:* The Counter Corruption project developed and applied a process for identifying the capabilities needed to counter corruption in a host-nation police force in an irregular warfare environment, and technologies that could help enable such capabilities.	0.233	0.000	0.000	
Phoenix - Phase II This project is to create a methodology to examine and identify a Country of Interest's (COI) current capabilities in nuclear weapons-related technologies. *FY 2008 Accomplishments:* This project developed science and technology-based methods for identifying critical technologies and significant regional actors that can affect progress in nuclear weapons development within selected COIs. The resulting analysis provided input into a risk profile of nuclear weapons capabilities for the COIs.	1.715	0.000	0.000	
Single Card Solution (SCS) The SCS is a two-way tracker module being developed for space-based tagging, tracking, and locating of individuals, vehicles, etc. The SCS also enables two-way, secure, low-probability-of-interception (LPI) data messaging, all in a very small package. Important and novel applications of the SCS have been proposed.	0.250	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Three production prototypes which are in "form, fit and function" exact approximations of the equipment needed in the field were delivered that will undergo further testing and evaluation				
Modeling Criminal Activity in Asymmetric Threat Environments This project utilizes the Institute for the Study of Violent Groups (ISVG) database and other data sources to model interrelationships between terrorism, gang activity, and organized crime. The ability to accurately model these interrelationships has provided a basis for improved strategies and tactics to disrupt insurgent activities earlier in the planning and execution cycle. *FY 2008 Accomplishments:* This project established access to the existing ISVG database, modified the collection focus based upon user requirements and constructed the database viewer application.	0.500	0.000	0.000	
Lighter Than Air Unmanned Sub-scale Demonstration The SKYBUS 80 unmanned airship demonstrats unmanned, scaleable Lighter Than Air Vehicle (LTAV) airship capabilities, techniques, procedures, and manning requirements. *FY 2008 Accomplishments:* Knowledge gained from this demonstration translated directly into plans for larger, production versions of unmanned LTAVs.	0.265	0.000	0.000	
Deductive Database for the Institute for the Study of Violent Groups (ISVG) This project provides a deductive database product, in which to house the model and data in the current ISVG database. This product will replace the current ISVG database. *FY 2008 Accomplishments:* The team built the domain model, transferred existing ISVG data to the new model and performed final testing and a demonstration.	0.205	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Development of Synthetic Environment for National Security Estimates (SENSE) Capability for Inter-Agency/ International Collaboration The objectives of this project are to train individuals in SENSE to enable them to collaborate and cooperate more successfully in conflict prevention, humanitarian assistance/disaster relief, stability, and post-conflict reconstruction operations and to expand the base of institutions which can help develop and deliver crisis simulations and options for resolution. *FY 2008 Accomplishments:* This project developed scenario and training capacities, conducted an inter-agency event, determined university level of involvement, trained university staff, adapted simulation documentation, conducted additional inter-agency events and determined future investment options.	0.500	0.000	0.000	
Program for Culture & Conflict Studies: A Web Gazetteer for the 21st Century This project allows for the expansion and development of its materials to include more detailed tribal maps, provincial and district summaries, political and tribal leadership profiles, and security analysis reports. This development work provides relevant research in support of current COIN and reconstruction programs in Afghanistan. *FY 2008 Accomplishments:* This project expanded and developed ongoing research and dissemination of socio-cultural / human terrain information on Afghanistan via an open-source web portal. It provided comprehensive assessments of tribal and clan networks in coordination with ongoing COIN operations and needs.	0.104	0.000	0.000	
National Tactical Integrated Processing System (NTIPS) Development Tasks These NTIPS development tasks includes multi-INT web enhancements, the addition of plug & play applications and new data layers.	1.000	1.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Multi-INT web enhancements and the addition of plug & play applications and new data layers were developed and have been added to the existing infrastructure and used to support military operations within the existing FADE Concept of Operations (CONOPs).				
Deployable Interagency Planning Augmentation Cell (DIPAC) DIPAC provides a reach back strategic communication planning capacity for Embassy country teams to produce interagency country and regional campaign plans to effectively apply the tools of soft counterterrorism to counter violent extremism and ideological support for terrorism. *FY 2008 Accomplishments:* This project developed regional interagency strategic communication campaign plans that support Chief of Mission Priorities and more effectively coordinate DOD, COCOM and Embassy planning, programming and resourcing.	0.150	0.000	0.000	
Detection of Unintended Radiation (DURAD) This will permit moving the previous DURAD system, housed on a large unique manned aircraft, onto a small aircraft or an unmanned aerial vehicle. *FY 2008 Accomplishments:* This work miniaturized the equipment and automated much of the analysis that required a human in the loop in the DURAD system.	0.347	0.000	0.000	
Rethinking Deterrence The Center for Technology and National Security Policy (CTNSP) conducted a workshop to re-examine deterrence concepts in the emerging security environment and consider ways to make the Deterrence Strategic Multi-layer Assessment (SMA) framework more useful for decision makers.	0.095	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: The project produced a refined framework to inform deterrence (and dissuasion/compellance) strategies, policies, concepts, education and ultimately investment decisions.				
Project Anubis The objective of this project was to develop, prototype, and test Non Line of Sight munitions with man-in-the-loop target ID with very low collateral damage as a proof of concept effort. *FY 2008 Accomplishments:* This project achieved longer range and time of flight as well as precision lethality against different target sets than current squad level capabilities allow	0.670	0.000	0.000	
Phased Approach to Demonstration and Deployment of RealityVision for Critical Counter-Insurgency and Counter-Terrorism Applications This project identifies organizations within the national security, intelligence, homeland security and law enforcement communities that had common technical and operational requirements in the areas of Force Protection, Command and Control, Intelligence, Surveillance and Reconnaissance (ISR) and operational issues in each of these application areas. Reality Vision brings a mobile networked command, control and communications capability to operational users. *FY 2008 Accomplishments:* This effort provided operationally demonstrated software and specifications for force protection.	0.350	0.000	0.000	
Worldwide Hot-Spotting Capability for the Joint Intelligence Preparation of the Operational Environment (JIPOE) Weapons of Mass Destruction (WMD) nexus with terrorist activities (JIPOE WMD-T) The objective of the work is for Gallup to use their radicalization and stability models on their World Poll data to provide an initial estimate of global hot spots, locations that exhibit characteristics of predisposition to instability and radicalization.	0.097	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: JIPOE WMD-T moved from the terrorist act to understanding and mapping the situations and group behaviors that spawn terrorist behaviors on a global basis.				
Targeting and Disruption of IED Networks This effort provided a detailed, layered analysis of financial tracking and illicit networks based upon data that has been collected by the Department of Commerce's Office of Export Enforcement (DOC/OEE). *FY 2008 Accomplishments:* This effort led to the indictment of 20 criminals within the Continental U.S. (CONUS) and overseas that were engaged in terrorist and criminal activities.	0.300	0.000	0.000	
Multiple Heterogeneous Cooperative UAVs Technologies – Phase II This project will develope a cooperative multiple UAV system that provides our soldiers with capabilities to continuously collect intelligence, conduct surveillance, and perform reconnaissance for mission planning and execution, friendly force protection, and exploitation of enemy weaknesses. *FY 2008 Accomplishments:* The project performed the necessary tests and refinement of multiple UAVs technologies for operational deployment. In addition, the project has designed and developed a standard multiple UAVs control, sensor fusion, and integrating software system in a compact, deployable unit suitable for a variety of small UAVs.	0.150	0.700	0.000	
Quantum Dot Vision The project will aid in the development of a covert taggant of people or objects in the non-visible regime. This can be used for blue force as well as adversary tracking when you want to avoid compromising the tagged assets or the actual tag.	0.250	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This project created robust, long lifetime infrared taggants that are easy to apply to many surfaces (including metals) and can be detected from a distance.				
Immediate Hemostasis with Novel Self-Assembling Peptide Fibers The objective of this work is to provide a better solution to the problem of life-threatening bleeding from combat injuries through the development of revolutionary absorbable fibers that stop uncontrolled bleeding after trauma. *FY 2008 Accomplishments:* The delivered material was an FDA-approved hemostatic material formulated for use by the warfighter.	0.500	0.000	0.000	
Civil Counter Insurgency (COIN) Under Fire This study proposed frameworks that provide analytic approaches to determining what civil actions best contribute to the counterinsurgency effort, and how to structure them (and the networks of services and infrastructure they use) so as to integrate security and civil efforts. *FY 2008 Accomplishments:* This project provided analytic frameworks, initial integrated concepts of operations, a project briefing and a peer reviewed monograph report.	0.100	0.000	0.000	
Montage Montage algorithms and related web-services enable behind-the-scenes, automated Advanced Geospatial-Intelligence (AGI) production hosted on commercial-off-the-shelf (COTS) hardware, allowing the expedient production and delivery of geospatial products to users. Montage reduces AGI production from hours/days to minutes and diminishes the need for expensive, manually-intensive AGI production. *FY 2008 Accomplishments:* This project operationalized the Montage algorithms and web-services.	0.461	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Thought-Leader Dialogue Series – Improving Effectiveness of Information Operations (IO) in Counter-Insurgency (COIN) Operations The objective of this dialogue series is to leverage the knowledge and experience of COIN/IO within the USG and private businesses and academe to improve US and Allied COIN and influence efforts. *FY 2008 Accomplishments:* This discussion series provided analysis, experimentation development, and recommended developments to improve IO for COIN operations.	0.200	0.000	0.000	
High Antennae for Radio Communications (HARC) This project enables US Forces to implement persistent line-of-sight (LOS) radio communications, both over wide regions and in mountainous or dense urban areas, where communications between war fighters are difficult. *FY 2008 Accomplishments:* The project provided a critical design review (CDR) and HARC developmental testing results.	0.350	0.000	0.000	
Advanced Presentation Tools This effort will produce high quality, easy to interpret movies, products and training materials for Force Protection, Operational Planning, and Strategy Development. These materials will be used by the Warfighter, support analysts, and the DoD community. *FY 2008 Accomplishments:* This project developed tools, techniques and procedures to produce effective, illustrative, information rich movies quickly and efficiently.	0.700	0.000	0.000	
National Technical Means Support to Tactical User - Phase 1 This project has implemented the use of National Technical Means (NTM) as part of the Thunderstorm sensor and data network to enhance tactical user support. Further Details are classified	0.500	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: Demonstrated the utility of NTM under direct control of the Warfighter and developed the tactics, techniques, and procedures to be used in the future. Further Details are classified				
Smart, Lightweight IR Polymer Emitters for Individual Identification, Friend or Foe (IIFF) and Vehicle Mounted Identification, Friend or Foe (VMIFF) Identify Friend or Foe at Cobra Gold This project supported further analysis of novel lightweight and low cost devices for remote identification using polymer based light emitting diodes (PLED). *FY 2008 Accomplishments:* This project producted four ruggedized VMIFFs for use in Cobra Gold experimentation and field tested new VMIFFs for remote activation from ground laser target designators (GLTD).	0.035	0.000	0.000	
Pilot Afghanistan Virtual Science Library (AVSL) at Kabul University The pilot Afghanistan Virtual Science Library at Kabul University offered students, scientists and engineer's access to international scientific, engineering, and technical journals and professional resources. Based on this pilot, the U.S. Civilian Research & Development Foundation (CRDF) developed a plan to extend the capacity to other universities and to Afghan government ministries. *FY 2008 Accomplishments:* The pilot project delivered a fully deployed functional website and VSL rollout assisted by key staff members of Kabul University and a project brief to the Afghanistan Ministry of Higher Education.	0.075	0.000	0.000	
Alternative Strategies Program Alternative Strategies is a coordinated, integrated operational analysis program which stimulates the levers necessary to change the radical Muslim ideological environment. Alternative Strategies integrates several analyses, workshops and conferences to empower activist reformers in the Muslim world and set off an indigenous influence campaign for a liberal counter-movement to the radical ideology.	0.876	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: The team delivered a written report on Iraqi Women Activists – Information Environment Baseline detailing current access to information technology and recommendations for expanding access. Blog sites and information portals have been developed to monitor and encourage communication among participants and new members.				
Foreign Analysis The objective of this project is to provide strategic decision makers critical information about a foreign country and how it affects United States policy in the Middle East. Further details are classified *FY 2008 Accomplishments:* This project developed an open source system tool for tracking comments by foreign elites in response to world activities, an open source system for tracking comments by Mideast regional elites regarding opinions toward the specified country and updated the Digital Workbook for the sponsor-designated country up to current status. Further details are classified.	4.363	0.337	0.000	
Information Operations (IO) to Defeat Coalition Enemies in OEF This project provides expertise and resources to both develop IO plans and educate forward deployed staffs. *FY 2009 Plans:* This project provides direct support to special operations units deployed in OEF. A faculty led student seminar has been in continuous and direct contact with the deployed SOF headquarters to develop IO plans to support the campaign against coalition enemies.	0.000	0.300	0.000	
Asymmetrical Lasercomm for Unmanned Vehicles The goal of this project is to develop and demonstrate small gimbaled modulating retroreflector (MRR) terminals for high bandwidth free space optical (FSO) communications between a base station and an unmanned vehicle (UxV) with limited payload capacity.	0.000	1.305	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This project produces and demonstrates an optical communications system that links an unmanned aerial system (UAS) with a ship or shore platform ground station for downloading covert, free streaming video or stored data.				
Counter-Motivation Block 1 (CMB1) The goals of CMB1 will help to create a suppression sphere around areas of ideologically-based extremism and terrorism. The intent of the individual projects is to produce targeted products for young and at-risk audiences in the Muslim world and through those products introduce ideas, content, and communication mechanisms that will seal the audiences off from radicalization. *FY 2009 Plans:* This program deploys several independent programs into conflict regions using the latest advances in social media and networking technology.	0.000	0.752	0.000	
Griffin Autonomous Unmanned Surface Vehicle (USV) Project This project will provide a mission level autonomy system for use with multiple unmanned surface vessels. *FY 2009 Plans:* This project developes and installes autonomous command and control systems and integrated associated sensors on two USVs which will permit the unmanned systems to cooperatively execute a maritime domain awareness task.	0.000	1.500	0.000	
Tracking Transnational Illicit Networks Using New Methods of Analysis & Communication This project is a collaborative research effort involving midshipmen at the United States Naval Academy who identify and analyze linkages among transnational criminal networks smuggling drugs and other contraband from Latin America or Africa to jihadist terrorists within Europe or the United States.	0.000	0.097	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This project provides junior naval and marine officers, with a wealth of new analytical skills and knowledge about real and potential links among criminal and jihadist networks.				
Foliage Penetration Reconnaissance, Surveillance, Tracking and Engagement Radar (FORESTER) Enterprise-Based Exploitation (FEBE) The Objective of the FEBE effort is to rapidly develop and demonstrate an automated exploitation tool that processes detections from the FORESTER radar and automatically detects activity, suppresses persistent false alarms and discriminates between people and wildlife. *FY 2009 Plans:* This project developes algorithms and software that performs automatic processing of the data to allow non-expert users to rapidly and reliably detect areas of significant activity, while rejecting false alarms and non-threat activity.	0.000	0.500	0.000	
Network Warfare: What's Next? This project conducts research on Network Warfare with focused research teams to explore the specific areas of Iraq, Afghanistan, the overall GWOT, Cyberspace and "Influence operations." *FY 2009 Plans:* Initial research follows an in depth study with faculty-student teams drilling down in greater detail regarding the future of Network Warfare.	0.000	0.050	0.000	
Strategic Assessment This project is researched, implemented and prototyped emerging cultural modeling programs, geospatial analyses techniques, precision influence targeting techniques, and other strategic multilayer analysis techniques in support of the operational customers desire to gain a greater understanding of the global strategic situation.	4.262	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This project will produce situational reports and social analysis.				
RRTO Visualization Tool This was a pilot project to quickly, and cost effectively, deliver a core visualization capability. *FY 2008 Accomplishments:* The RRTO Data Visualization took key RRTO data contained in past and present versions of the PowerPoint fishbone file, made it highly interactive, and provided interactive visual filtering and searching capabilities.	0.125	0.000	0.000	
Discourse Analysis *FY 2008 Accomplishments:* The objective of this effort was to identify a set of leading cues/indicators of adversary action based on analysis of discourse accent and discursive practices, develop a methodology to detect/extract/exploit these cues/indicators and identify existing or modified tools to operationalize the methodology. *FY 2009 Plans:* This project provided a socialization workshop with the analyst's final report.	0.200	0.000	0.000	
Remainder of FY09 funding *FY 2009 Plans:* Investment decisions are made during the execution years in response to combatant commanders, services and other government organization's requirements and as new threats emerge or new opportunities are presented. RRTO's FY09 goals include: expand Irregular Warfare focus beyond Afghanistan / Iraq; examination of terrorist / criminal interfaces; development of non-kinetic capabilities including support for strategic communications; and increased interagency coordination.	0.000	39.004	0.000	
RRF 2010 Plans	0.000	0.000	49.406	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2010 Plans: RRF investment decisions are made during the execution years in response to combatant commander, service and other government organization's requirements 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 counterterrorism/ counterinsurgency capabilities. FY10 plans include development of ISR and muli-int fusion capabilities through the ongoing Project Thunderstorm exercise series, manipulation and exploitation of large data sets, continued support for projects that explore the overlap of criminal and terrorist groups, development of forensics capabilities to exploit hostile sites, expansion of capabilities to foster small dispersed until operations and initiation of a business cell to foster interaction between DoD and small companies.				
RRF FY11 Goals	0.000	0.000	0.000	
Augmented Reality to enhance Special Warfare Domain Awareness *FY 2009 Plans:* Congressional Add to be executed	0.000	1.600	0.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

QRF/RRF: Program completion and success will be monitored against program schedule and deliverable stated in the proposals.

TTI: In FY 2008, initiated the new start of 14 projects and concluded the activities on many continuing projects with the result of 9 technologies transitioning to the warfighter.

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In FY 2009, initiate the new start of 7 projects and conclude the activities on many continuing projects with the result of at least 13 technologies transitioning to the warfighter.

In FY 2010, initiate the new start of 12 projects per year and conclude the activities on many continuing projects with the results of 11 technologies per year transitioning to the warfighter.

RRF: In FY 2008/FY 2009/FY 2010 RRF investment decisions are made during the execution years in response to combatant commander requirements and new threats/new opportunities.

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P829: Technology Transition Initiative (TTI)	28.169	26.835	29.361						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Quick Reaction Special Projects Program (Program Element 0603826D8Z) has three sub-elements: the Technology Transition Initiative (TTI), the Quick Reaction Fund (QRF) and the Rapid Reaction Fund (RRF). The fiscal controls above represent the investment of the QRSP Program funding for the TTI Program.

Authorized by Title 10 and Section 215 of the FY2003 Defense Authorization Act, the Technology Transition Initiative (TTI) facilitates the rapid transition of new technologies from the DoD science and technology (S&T) base into DoD acquisition programs. The program addresses the funding gaps that exist between the time a mature technology is demonstrated and the time it can be funded and procured for use in an intended weapons system or operational capability for the warfighter.

TTI projects are selected by the Technology Transition Manager (Office of the Deputy Under Secretary of Defense (Advanced Systems and Concepts) (DUSD(AS&C)) in consultation with representatives of the Technology Transition Council (TTC). (The TTC is comprised of the Acquisition and S&T executives from each Service and Defense Agency and representatives from the JROC.) The call for TTI proposals is distributed to the DoD Services and Agencies through the Technology Transition Working Group (TTWG) members, designated by the TTC. The TTWG members receive proposals from their Service/Defense Agency S&T base, conduct a prioritization based on Joint, Service or Agency capabilities needed and submit them to the OSD TTI Program Manager. The Technology Manager's senior staff consolidates the proposal submissions, evaluates the Service/Agency recommendations, reviews new start selection options based on available resources, and prepares a recommended new start selection list to the Technology Transition Manager for funding. The Technology Transition Manager, in coordination with the TTC, selects the highest priority proposals for funding.

The OSD FY 2009 proposal call memo was signed out by the Technology Transition Manager on February 27, 2008, requesting the Services, Agencies and CoComs provide their prioritized inputs by April 30. These proposals were to focus on projects having great impact for the warfighter, (i.e., potentially fewer projects with larger dollar values) that enable affordable and decisive military superiority. The memo also indicated that OSD priorities were to deliver focused technology to meet warfighter needs. To meet these needs and accomplish the Department’s strategic objectives, critical capabilities have been defined and aggregated into the following high-level mission areas: Total Battlespace Awareness; Stability Operations, Cultural Awareness, and Force Management; Command, Control and Information Management & Net-Centric Operations; Protection; Joint Training; and Tailored Force Applications. A total of 26 proposals were formally submitted to OSD, addressing these mission areas. These proposals are being evaluated against the following evaluation criteria: TTI funding must accelerate product transition, project is from DoD S&T base, cost sharing to leverage TTI funding, project duration less than four years, established exit criteria, potential for joint use, value to the warfighter, sufficient technology maturity, and commitment to transition/acquisition.

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Final selection of FY 2010 TTI new start projects will be determined in in the July 2009 timeframe. A listing of initiatives under review for selection by OSD can be provided to congressional staff members during the budget review.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
AIM-9X Electric Arm Fire Device (EAFD) (Navy)	0.403	0.000	0.000	
The Joint Requirements Oversight Council (JROC) validated the early transition of "In-Line" Electric Arm Fire Device (EAFD) with Exploding Foil Deflagrating Initiator (EFDI) Technology into the AIM-9X Sidewinder Missile Air-to-Air Weapon System as a FY07 new start. The outcome of early EAFD transition is enhanced US Navy aircraft carrier flight deck operations, a significant reduction in USN/USAF logistic support costs, greater weapons system reliability and enhanced system safety. The two-year project is under the sponsorship of Naval Air Systems Command (NAVAIR) Program Executive Office for Weapons PEO(W) Program Management Activity with transition to production in CY2008. The lead Service is the Navy. The primary outputs of this early transition program are as follows: 1) Eliminates the current burden on ordnance crews to manually arm/disarm AIM-9X Sidewinder missiles after every sortie; 2) Improves cold weather flight operations; 3) Improves Nuclear, Biological, Chemical Operations; 4) Eliminates logical reprogramming operations; 5) Improves 9X Weapon System Probability of Launch by 1%-3%; 6) Lowers weapon system radar cross section planar cross section on aircraft; 6) Enhances weapon system safety; 7) Enables 9X Sidewinder canister employment (i.e., USN Sea Serpent). Previously Accomplished: Qualification testing of Exploding Foil Deflagrating Initiator (EFDI) subassembly completed. Qualification of Electronic Arm Fire Device (EAFD) component completed. Began integration and design verification testing of EAFD with the Block II Sidewinder air-to-air missile. Initiated design coordination with Safety Boards. *FY 2008 Accomplishments:* The following events have been completed: integration and design verification testing of EAFD with Block II 9X Sidewinder; and ground based environmental qualification testing of EAFD with Block II 9X Sidewinder. Qualification testing started in May 2008.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Engineering Change Proposal (ECP) approval is projected to occur in FY 2009. Upon ECP approval, the plan is to transition EAFD with EFDI technology into Block II 9X Sidewinder production. Transition Manager is NAVAIR, PEO(W), PMA-259.				
Automated ALRE Reading (AutoREAD) Sheets (Navy)	0.400	0.000	0.000	
AutoREAD is an automation and process improvement project that uses personal data assistants (PDAs) to eliminate paper logkeeping and streamline the collection, analysis, and reporting of launch and recovery equipment preventative maintenance measurement data. Its purpose is to reduce Aircraft Launch and Recovery Equipment (ALRE) maintenance workload and gain improvements in equipment readiness, safety, engineering support, and fleet metrics. It creates an infrastructure for continuous ALRE reliability improvement into the future. The primary outputs and efficiencies of this program are as follows: 1) Improvements in quality, accuracy and legibility of measurement data by 20%; 2) Process improvement from the use of integrated Reading Sheets (1-2 hours per maintenance action); 3) Process improvement from the use of electronic signatures on arresting gear (AG) Reading Sheets (1 hour savings per maintenance action); 4) Reduce effort and cost required to track completion of Maintenance Actions with associated Reading Sheet data. Previously Accomplished: Development of software requirements specification, system design. Coding and Testing of AutoREAD including Integration testing with Aviation Data Management and Control System (ADMACS). Procurement of hardware for initial ship test. Successfully demonstrate AutoREAD application. *FY 2008 Accomplishments:* Completed Land Based integration testing, ship board integration testing, and production deliveries. Completed transition of AutoREAD under ADMACS Block 2. The planned elements of AutoREAD were demonstrated as a component of ADMACS block 2 production deliveries.				
Diagnostics Avionics Tester for On-aircraft Maintenance (Navy)	0.738	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The F/A-18 Program Office has an immediate need for Support Equipment (SE) items that can reduce maintenance costs, and reduce ambiguities between systems and components at the on-aircraft maintenance level. The outcome of the "Diagnostics Avionics Tester for On-Aircraft Maintenance" Technology Transition Initiative (TTI) project will be to incorporate net-centric diagnostics technologies into the Tactical Reconnaissance (TAC RECCE) and Electro-Optical Infrared (EO/IR) F/A-18 Maintenance Programs by developing a prototype Diagnostics Avionics Tester and Net-Centric Diagnostics Framework that can replace the AN/USM-681 Electro-Optics Pallet/Pod Tester (EOPT). The exit criteria will be a successful demonstration of the prototype Diagnostics Avionics Tester and Net-Centric Diagnostics Framework with a F/A-18 squadron equipped with the AN/ASQ-228 Advanced Targeting Forward Looking Infrared (ATFLIR) Pod and a F/A-18 squadron equipped with the AN/ASD-12 Shared Reconnaissance Pod (SHARP). The primary outputs and efficiencies include: a one percent increase in ATFLIR and SHARP operational availability; (2) cost reduction for maintenance and repair; (3) increase in fault detection and fault isolation rates; (4) run time reduction for F/A-18 Automated Test Equipment at the off-aircraft maintenance level; (5) percent reduction in false alarms/cannot-duplicate occurrences; and (6) percent reduction in logistics footprint for the new Support Equipment at the on-aircraft maintenance level. One prototype and a Level 3 technical data package will be provided to the F/A-18 Program Office. The F/A-18 Program Office will procure production versions of the Diagnostics Avionics Tester and Net-Centric Diagnostics Framework beginning in FY 2008 with life cycle support implemented in the first year of procurement. Deliverables will be due in FY 2009 and FY 2010. Previously Accomplished: Procurement of militarized commercial-off-the-shelf (COTS) tablet PC to serve as the processor unit for the prototype Diagnostics Avionics Tester. Completion of development of the avionics interface for the prototype Diagnostics Avionics Tester. Completion of first software builds for the Net-Centric Diagnostics Framework, ATFLIR Computer Software Configuration Item (CSCI), and SHARP CSCI.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: The Diagnostics Avionics Tester and Net-Centric Diagnostics Framework successful completion of all test efforts and approval for flight line use. Demonstrated prototype Diagnostics Avionics Tester and Net-Centric Diagnostics Framework at a F/A-18 squadron equipped with the AN/ASQ-228 ATFLIR Pod, and a F/A-18 squadron equipped with the AN/ASD-12 SHARP. Provided one prototype and a Level 3 technical data package (TDP) to the F/A-18 Program Office. Incorporated net-centric diagnostics technologies into the Tactical Reconnaissance and Elector-optic/Infrared F/A-18 Maintenance Programs by procuring production versions of the Diagnostics Avionics Tester and Net-Centric Diagnostics Framework to replace the AN/USM-681 Electro-Optics Pallet/PoD tester (EOPT).				
Image Compression for Digital Precision Strike Suite (Navy) The purpose of the Image Compression for Digital Precision Strike Suite project is to transition a matured compression software suite to Special Operations Forces (SOF) that will shorten the upload time for image and video data files. It provides a much needed capability to mitigate bandwidth limited communications problems without compromising the image quality and information needed for subsequent analysis upstream. The primary outputs of this project are as follows: A compression software suite with high quality image and high compression ratio for SOF radios that mitigate today's communication data link issues. *FY 2008 Accomplishments:* Implemented software suite on Precision Strike Suite - SOF laptops and completed testing and validation in field units.	0.400	0.000	0.000	
N-Acetylcysteine (NAC) Clinical Trials for Hearing Loss Prevention (Navy) The Joint Requirements Oversight Council (JROC) validated the capability need for the investigation into NAC for prevention of hearing loss. The outcome of the project is to facilitate the final transfer of this cutting edge pharmacological technology of antioxidant therapy for the prevention and reduction of hearing loss from the basic science laboratory into the operational environment. This two-year project is under	1.000	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
sponsorship of Navy Medical Research Center, with completion of development and demonstration by end of FY 2008, transition to pharmacy by FY 2009. The primary output for this study is a 40 to 50% reduction in average threshold shifts for NAC participants compared to placebo. *FY 2008 Accomplishments:* The following efforts have been completed or initiated: 1) Completed clinical study preparation, documentation and site preparation and initiation; 2) Studied execution, data analysis, and obtained FDA approval; 3) Began transition with acquisition of national stock number through the Defense Medical Standardization Board; 4) Completed transition via Tri-Care Management Authority for Pharmacy and future integration into operational forces. This project was previously referred to as "Prevention of Hearing Loss -- Hearing Pill"				
Operational Gliders for Battlespace Reconnaissance and USV Surveillance (Navy) The Chief of Naval Operations and the Oceanographer of the Navy validated the requirement for an operational glider for battlespace reconnaissance and included ocean gliders as part of the Littoral Battlespace Sensing, Fusion and Integration (LBSF&I) Program of Record. The Technology Transition Initiative will accelerate the transition of ocean gliders to operational readiness. The outcome of this program is the development of robust ocean gliders that are certified for operational deployment (six prototypes of improved and hardened gliders will be initially delivered) together with an operationally feasible (roll-on, roll-off) deployment and recovery system, a command and control system, and an approved manufacturing process. The completion of the operational glider prototypes, all other deliverables, demonstrations and documentations will be completed at the end of FY 2008. The TTI Program funding accelerates the achievement of technical readiness by 36 months (FY 2008 vs. FY 2011). The primary output and efficiency to be achieved in this project is operationally robust underwater gliders that obtain data to reduce the uncertainty in the performance prediction of the acoustic sensors	0.800	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
by providing near real-time 3-D acoustic properties of the ocean, including sonic layer depth, ducting conditions and sound channel characteristics. Networks of gliders together with distributed networked bottom sensors reduce the occurrence of false contacts. Additional outputs and efficiencies include the following: (1) glider configuration such that they can accommodate optical sensors that facilitate non-acoustic Anti-Submarine Warfare (ASW) measurements; (2) an approved manufacturing capability so that acquisition of large numbers of gliders can facilitate the fleet establishing networks of 10-30 gliders. (These networks of gliders provide real-time environmental data in the operational area of interest. These data provide mission planning modules with the initial and evolving deep or shallow water environmental data); (3) gliders with the capability to provide long duration sampling (1 month to 3 months), and to provide real-time data at a far lower cost (present estimate is $4 per glider vertical profile vs. present cost of $1000 per profile via ship) with immediate delivery of data to operational fleet commands; (4) gliders that, once deployed, do not (now) and will not require support from fleet assets such as ships, aircraft, or submersible platforms; piloting and data flow will be remote but real-time with global coverage. The project will achieve roll-on-roll-off deployment from surface platforms and a common command and control system for all glider types. *FY 2008 Accomplishments:* The following tasks have been completed or initiated: 1) Completed construction of six prototypes of improved and hardened gliders; 2) Approved certification of the manufacturing process, documentation and configuration control systems completed; 3) The final prototypes, along with the deployment/recovery systems and command system were tested at sea; 5) Approvals and certification completed; 6) The design criteria and tested prototypes are timed to be synchronous with the initiation of LBSF& I funding for acquisition.				
Self-Powered Tray Ration Heater (Army) The objective of the Self-Powered Tray Ration Heater (TRH) project is to apply thermoelectric technology to a standard TRH to enable operation independent of vehicles and generators. The TRH was designed to heat 18 six-pound packages of shelf stable food (tray packs) for Company-sized groups of Warfighters. The TRH uses a commercial oil burner (configured to burn JP8) to heat 10-15 gallons of water to close to 200°F. This allows tray packs to be placed in the hot water for 30 minutes to bring them up to serving	0.450	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
temperatures. Versions of the TRH are used by the Army in the Assault Kitchen (AK), the Marine Corps in the Tray Ration Heating System, and the Air Force in the Single Pallet Expeditionary Kitchen. A secondary objective of this program is to provide a universal STRH that all four services as well as Federal Emergency Management Agency (FEMA) can procure, operate and support. The current TRH requires approximately 200 watts of power for operation, which must be supplied by a (High Mobility Multipurpose Wheeled Vehicle) HMMWV or generator. A self-powered capability improves overall reliability, availability, and maintainability characteristics, since a generator or vehicle power supply are inherently less reliable and require more maintenance than solid-state thermoelectric modules. Due to the limited number of HMMWVs available to Food Service, alternative mounting configurations with HMMWV trailers are needed. The self-power version of the TRH along with a Trailer mounted version of the AK will allow the HMMWV to be used for other missions when the AK is set up and feeding Warfighters. This project has applications to all DoD services and FEMA. The primary outputs of this program are as follows: a standard TRH to enable operation independent of vehicles and generators. *FY 2008 Accomplishments:* The following tasks were completed or initiated: 1) Conducted in-house technical and operational tests, producibility study, and production of 10 test units; 2) Technical and operational tests in the field; 3) Updated Technical Data Packages and Technical Manuals; 4) Developed joint requirement and procurement document; transferred to procurement.				
Sense and Avoid (SAA) for Small UAVs (SUAV) (Air Force) Air Force has validated the need for a Sense and Avoid (SAA) capability for Small Unmanned Aircraft Systems (SUASs). The outcome of Small Sense and Avoid System (SSAASy) is to create a miniaturized version of Air Force Research Laboratories' (AFRL) Phase-I Advanced Technology Demonstration SAA system developed for the RQ-4 Global Hawk UAS. The miniaturized system will include the hardware and software necessary to alert the ground-based pilot and/or an on-board collision avoidance maneuvering subsystem of any potential collisions. The system enhances the situational awareness of a SUAS in both the National Airspace System (NAS) and in operational environments, and will go a long way in meeting	0.200	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
the Federal Aviation Administration's standards for granting UASs access to the NAS. Development and demonstration will be completed by FY 2010/2Q. Transition will be to both the Air Force Small UAS office and to the Army Project Manager for UASs in FY 2010. The primary outputs and efficiencies to be demonstrated in this technology transition initiative are (1) decrease in the hardware's size, weight, and power to fit in the RQ-7 Shadow size SUAS; (2) identification of and creation of software architecture able to integrate SAA data seamlessly with SUASs' ground control stations; (3) identification of and creation of a system that requires minimal modification to the unmanned aircraft; and (4) estimated 24 month advancement of a SAA system transitioning to the field. *FY 2008 Accomplishments:* The following tasks were completed: 1) Completed design and system prototype fabrication; 2) Completed size, weight, and power (SWAP) trade study; 3) Completion of flight demonstration; 4) Transition of technical solution to the Shadow UAS program				
Unmanned Surface Vehicles for Littoral Combat Ship Missions (Navy) The Joint Requirements Oversight Council (JROC) validated the capability need for Unmanned Sea Surface Vehicles (USSVs) for Littoral Combat Ship (LCS) Missions. The outcome of this TTI program will provide enhanced capabilities, via the USSV, that will be a key enabler for LCS's ability to perform its three primary missions of Mine Countermeasures (MCM), Anti-Submarine Warfare (ASW) and Surface Warfare (SuW), as well as other missions such as Expanded Maritime Interception Operations (EMIO) and Electronic Warfare (EW). TTI Program funding will provide the final level of maturity to transition the USSV to acquisition for deployment on the LCS. The output of the project will be to design and build an advanced USSV that is optimized for LCS missions. The lead service is the Navy. *FY 2008 Accomplishments:* The second payload was installed on the USSV. Payload/USSV At-Sea Test: the performance of the Payload/USSV system was characterized in at-sea tests. Technical package describing the Payload/	2.000	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
USSV system were delivered to LCS Mission Module Program Office. The Transition Manager for this TTI Program is the LCS Mission Module Program Office. The final demonstration was completed in FY 2008. TTI program completion date is 30 September 2008.				
Warfighter Hearing Enhancement and Protection (Navy)	1.400	0.000	0.000	
In FY 2006 Office of the Chief of Naval Operations (OPNAV) validated the need to improve aircraft carrier flight deck crew helmets, including better hearing protection and communication ability, by establishing the Flight Deck Cranial (FDC) program. The FDC is to surpass existing helmet performance in key areas related to safety standard compliance and life cycle efficiency per FY 2005 Deputy Assistant Secretary Navy (Safety) Business Case Analysis. FDC is sponsored by OPNAV N8 with planned transition to U.S. Navy operational commands in FY 2010. Transition PM is Naval Air Systems Command PMA202 Aircrew Systems. An Evolutionary Acquisition Strategy and a Spiral Development approach will be used to deploy qualified hearing enhancement and protection equipment technologies: (1) replace existing subsystems during routine maintenance, (2) Engineering Change Proposal (or similar) to existing hearing/head protector, (3) system replacement to attrited system(s), and (4) standardized system acquisition. FDC system outputs and efficiencies include (1) American National Standards Institute (ANSI) speech intelligibility test demonstrates 20 percent gain or more, (2) ANSI hearing protection test demonstrates 3 dB gain or more, (3) greater than 50 percent use the hearing protection correctly (current estimate is 7 percent), (4) fit an estimated 95 percent of the U.S. Navy personnel population (size, shape, gender, race), (5) meets/ exceeds ANSI head protection standard, (6) compatible with chem-bio and fire protection clothing. *FY 2008 Accomplishments:* Final Operational Demonstration of hearing enhancement and protection technologies were completed. Developed Integrated Logistics Support Plan (Implementation, Configuration Control, Maintenance, Tech Manuals, Training Package, etc) to transition hearing protection and communication technologies for use in existing flight deck helmet. Spiral Output - approved existing flight deck helmet with improved hearing protection and communication technologies for fleet procurement. TTI Efforts Culminated in follow-on Research Development Test and Evaluation (RDT&E) and Other Procurment Navy (OPN) funding.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Accelerated Implementation of Extremely Insensitive Detonating Substance (EIDS) and Insensitive Munitions Solution in 155mm Artillery Ammunition (Army)	3.300	1.950	0.000	

This effort accelerates the transition to production of technologies that eliminate or minimize accidental hazards for munitions. Insensitive Munitions (IM) minimize damage or loss of life and property due to reduction in sensitivity of the munition to external stimulus. Compliance is required by public law and mandated by DoD regulation. In addition to meeting IM requirements, the technologies will satisfy Extremely Insensitive Detonating Substances (EIDS) classification requirements for the 155mm high explosive loaded artillery projectiles being procured by the Army and USMC. EIDS munitions dramatically enhance the warfighters' survivability by reducing the reaction to unplanned stimuli, e.g., fire, mass detonation, etc., and increase safe storage capacity of ammunitions by lowering the quantity distance in accordance with the relaxed requirements that go with EIDS designation.

Program Outputs and Efficiencies: EIDS classification will change the current Hazard Class from 1.1 (greatest hazard) to 1.6 (least hazard). The 1.6 hazard classification level allows more compact storage and shipping than otherwise, with consequent reduction of logistics costs for this widely procured Army and USMC projectile. This project will accelerate the fielding of new IM technologies from forecasted FY2 012 to FY 2009.

FY 2008 Accomplishments:

Producibility studies of candidates made with non-traditional materials were applied to manufacture production quantities of the explosive formulations. The resulting output of explosive will subsequently be used to optimize the loading parameters of the artillery projectiles. Some of the parameters are: temperature of the empty shells, temperature of the molten explosive, rate of loading, cooling cycles, etc. This critical step will ensure successful transition of the technology to the industrial base. The properties of the explosives, e.g., thermal, physical and chemical, are going to be further characterized as part of the safety requirements. This data will also fulfill the requirements of the Energetic Material Qualification Board (EMQB) test matrix which ensures safety and long term suitability of the material; Simultaneously the new explosive and IM technologies are to be applied to the projectile design for testing in the 155mm howitzer systems. Gun qualification tests to address safety, performance and reliability requirements were commenced.

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Using the FY2008 EMQB test matrix, all the long-term tests will be completed to qualify a new insensitive explosive formulation. The gun qualification tests will also be concluded. Any complimentary modifications to the design will be accomplished. Lethality assessment will be carried out by a full-scale arena test. Formal IM tests will be performed to demonstrate compliance with current DOD IM requirements and determine the final EIDS classification. Conclusion of this project will result in a Technology Readiness Level 9 (TRL 9) maturity which will be implemented by the Project Manager Combat Ammunition Systems for their applicable programs.				
Combined Arms Planning and Execution-monitoring System Integration into Force XXI Battle Command Brigade and Below (FBCB2) (Army) This program addresses an emerging requirement for a planning capability to reside within Force XXI Battle Command Brigade and Below (FBCB2). In Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), FBCB2 has emerged as a critical Command and Control (C2) system in both traditional and asymmetrical warfare environments. However, FBCB2 does not currently contain planning software. Both the current FBCB2 Operational Requirements Document and the draft Capabilities Development Document for the Joint Battle Command Platform (JBCP) cite requirements for decision support aids, mission planning/rehearsal, mission execution and the ability to interface with onboard/system-specific Command Control and Communication (C3) tools. The output of this program is to provide an automated planning and execution tracking capability within FBCB2. The planning capability will be derived from Combined Arms Planning and Execution-monitoring System (CAPES) and the emphasis is placed at the tactical level, allowing lower echelon commanders to provide task status reporting vertically through the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architecture. The planning and execution tracking will provide a total situational awareness through the sharing of subordinate unit and sister unit plans. Outputs and efficiencies include: (1) Percentage reduction in the time to develop combat plans (goal is 35 percent reduction); (2) Percentage increase in the ability to Monitor execution, assess effects, and adapt (goal is 25 percent); (3) Percentage increase to track execution at allowing lower echelon commanders to	0.950	0.975	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
provide task status, reporting vertically through the C4ISR architecture (goal is 90 percent). (4) Percentage increase in the ability to support Military Operations in Urban Terrain (MOUT) through movement planning tools that consider man-made obstacles and infrastructure and total situational awareness through the sharing of subordinate unit and sister unit plans (goal is 20 percent). This is a two year effort with the completed package delivery within FBCB2/Joint Battle Command Platform (JBCP) software baseline and installed on all platforms for SoftWare Blocking (SWB) 4 (expected to be 44,000 platforms). TTI accelerates the transition of this capability by two years. *FY 2008 Accomplishments:* The following tasks were completed or initiated: 1) Port baseline software to Linux; 2) Performed collaboration network bandwidth testing; 3) Determined and prioritized the core set of requirements with TRADOC Capabilities Manager (TCM) that exist in CAPES and that should be transitioned into FBCB2; 4) Began integrating high priority capabilities into JBCP, including movement planning, attrition modeling, Course of Action (COA) sketch, wargaming and rehearsal; 5) FY 2008 deliverables included: Requirements documentation, Network and bandwidth test results, Linux porting results, design documentation, and source code for high priority capabilities. *FY 2009 Plans:* Complete integration of high priority items, and integrate lower required capabilities identified by the TCM. Perform integration testing, and deliver software into the FBCB2/JBCP software baseline. Deliverables for FY 2009 include: source code for all completed capabilities, test plan documentation, user documentation, test results and release notes, and final integrated product.				
Efficient XML (DISA) Efficient Extensible Markup Language (XML) is a commercial off-the-shelf product that optimizes open web standards and web services so they can be used in environments with limited bandwidth, processing power, and battery life. Efficient XML provides a single, common, interoperable Network-Centric web format for sharing information across the DoD enterprise from the top decision makers, command-centers and Command and Control (C2) systems down to the individual aircraft, ships, vehicles and foot soldiers operating in harsh environments with limited resources. It provides a low-cost software solution	0.241	0.984	0.913	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
for bandwidth expansion and enables the DoD to use inexpensive, web technologies in place of expensive proprietary technologies. Efficiencies/outputs: Efficient XML dramatically reduces the bandwidth required by Net-Centric web technologies (XML, web services, service-oriented architectures (SOA)) and increases their speed by up to 100-400 times. This optimizes performance across the enterprise and extends the reach of Net-Centric Operations to platforms with limited bandwidth, memory, processing power and/or battery-life, such as tactical military platforms, PDAs and smart-phones. *FY 2008 Accomplishments:* This project demonstrated three prototypes integrating eXML into the Net-Centric Command Capabilities (NECC) environments that will serve as benchmarking tools for future testing. The prototypes: a) exchanged basic Service Oriented Architecture data using XML-based messaging; b) exchanged data using a publish and subscribe data exchange pattern with XML and; c) addressed special issues associated with Disadvantaged Intermittent Low Bandwidth users. *FY 2009 Plans:* This project will incorporate the eXML prototypes into the NECC Federated Development and Certification Environment (FDCE) and integrate them into NECC Capability Modules (CMs). Specific integration plans will be developed for each CM and coordinated wit the CM delivery schedule. The specific eXML capability delivery schedules will be created so as to minimize critical dependencies between eXML-specific tasks and other tasks within the NECC CM development schedules. *FY 2010 Plans:* This project will incorporate the eXML prototypes into the NECC Federated Development and Certification Environment (FDCE) and integrate them into NECC Capability Modules (CMs). Specific integration plans will be developed for each CM and coordinated wit the CM delivery schedule. The specific eXML capability delivery schedules will be created so as to minimize critical dependencies between eXML-specific tasks and other tasks within the NECC CM development schedules.				
Electronic Image Intensifier for Pilotage (Army)	3.970	2.750	2.174	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
This project will integrate Electronic Image Intensifier (EI2) technology into a lightweight sensor for the Apache Modernized-Pilot's Night Vision System (M-PNVS). Two form-fit, function and flight ready EI2 prototypes will be developed, built, and delivered to PM Apache for aircraft qualification and users evaluation flights. The EI2 camera will provide performance that is equal to or greater than the current aviator's night vision goggles and at the same time allow for image fusion with the second generation Forward Looking Infrared (FLIR) on the Apache helicopter. Program Outputs and Efficiencies: meet pilotage requirements for dynamic motion, resolution, and contrast through improved readout electronics and high definition format (1920 x 1080); exit criteria to be met include Aviator's Night Vision Imaging System (ANVIS) performance and $35 thousand per camera; two pre-production prototype cameras delivered for operational flight testing in FY 2010. TTI funding accelerates the transition of this capability by two to three years. *FY 2008 Accomplishments:* This project completed designed and modified 1280 x 1024 read-out integrated circuit (ROIC) and defined 1920 x 1080 high definition (HD) format requirements. *FY 2009 Plans:* This project will complete design, fabrication, and test of 1920 x 1080 ROIC and camera electronics. *FY 2010 Plans:* This project will fabricate two prototypes; conduct reliability and environmental testing; conduct engineering flight testing; integrate into Apache aircraft; complete aircraft qualifications and operational flight testing.				
Fuel Cell Powered Long Endurance Expendable Unmanned Aircraft System (Navy) The Navy and Special Forces have counterterrorism technology requirements that include an over the horizon (OTH) intelligence, surveillance and reconnaissance (ISR) capability using small unmanned aerial systems (UAS)s. Battery powered UASs, although inherently stealthy and safer to operate in most environments, lack the necessary endurance required for SOF/ISR operations and because of power and	1.450	0.000	2.065	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
weight issues, have low grade electro-optical (EO) cameras. Currently, there is no existing UAS that can meet the needs and requirements. This technology gap prevents current (classified) SOF war plans from being executed. This project will mitigate the problem by completing the development and demonstration of a small, expendable, long endurance, fuel cell powered UAS (the XFC) with a real time high resolution electro-optical/infrared (EO/IR) payload. *FY 2008 Accomplishments:* This project demonstrated a fully integrated and fully autonomous fuel cell system as the energy source for propelling a UAS (the XFC) and its high resolution electro-optical payload. *FY 2010 Plans:* Efforts will result in the delivery of two-four XFC UAS with a ground station and an end to end test of autonomous flight with linkages to a surfaced submarine or a land vehicle to demonstrate industry readiness by third quarter of FY 2010. Planned transition to Navy production is scheduled to start in FY 2010.				
Improved Heating Technology for the Unitized Group Ration - Express (Army) The Improved Heating Technology (IHT) project addresses a critical need for non-hydrogen producing chemical heating technology for the Unitized Group Ration Express (UGR-E) Military group self heating meal application that does not produce hydrogen as a by-product of the heating process. The Primary goal of the IHT TTI project is to accelerate transition of new heater technology into an on-going UGR-E procurement that eliminates operational, transport, and storage restrictions attributed to hydrogen by-product of the current heater and thereby foster potential commercial applications and expanded industrial base. Additional benefits that may be realized through the IHT initiative include additional sources of supply beyond the current sole source, and improved performance, quality, and cost. Alternative ration heating technologies to be considered include an exothermic air-activated aluminum/zinc/nickel heater, a blended phosphorous pentoxide (P2O5) and calcium oxide (CaO) anhydrous heater, and an enhanced Mg-Fe heater that couples manganese dioxide in the heater matrix.	0.652	0.712	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Program Outputs and Efficiencies: 1) Raise the temperature of the shelf stable polymeric food trays from 40 to 140 F in less than 45 minutes; 2) Weigh less than 500 grams per heater with a unit cost less than 3 dollars and pose no operational, storage, transport, or disposal restrictions; 3) Provide a drop-in product replacement for existing UGR-E heater product and enable an immediate transition of non-hydrogen heater technology for full rate production by Defense Supply Center Philadelphia (DSCP) in FY 2010. *FY 2008 Accomplishments:* This project supported: 1) Rapid transition of improved heating technology from Small Business Innovation Research (SBIR) and Broad Agency Announcement (BAA) contracts; 2) Fabricated and assembled prototypes using scaleable manufacturing processes evaluating them against the current heater requirements for performance, safety, weight/volume, shelf-stability, manufacturability, and cost factors. *FY 2009 Plans:* This project integrates heaters within the UGR-E assembly and test in an operational environment to assess reliability, durability, and user acceptance. It will complete performance specifications and transition to DSCP for direct, rapid implementation to the target UGR-E and commercial applications.				
Strategic Initiative on Innovation and Technology Transition This is a special project of the Director, Defense Research and Engineering (DDR&E) to support an AT&L initiative to create new pathways for DoD to find and access innovation and technology from the global marketplace, and accelerate its movement to the Warfighter. Program Outputs and Efficiencies: The Strategic Initiative on Innovation and Technology Transition team will provide required analyses of transition-related military needs, development of alternative solutions to satisfy these needs, and assessment of options to select the most effective solution for finding, accessing and harvesting innovation into a fielded capability.	0.265	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2008 Accomplishments: This project reviewed and analyzed existing mechanisms for finding, accessing and harnessing non-traditional sources of technology/innovation to support capability gaps and shortfalls. In a White Paper, stated the problems and recommended new approaches to reach out and access non-traditional sources of innovation and technology that might be adopted by the Department. Facilitated the development of processes and partnerships that highlighted the need for a more robust, agile and innovative environment in which to develop and accelerate the delivery of capabilities to the warfighter. Initiated actions to support AT&L's follow-on guidance. Prepared a draft strategic communications plan.				
Joint Service General Purpose Mask Filter End-of-Service-Life Indicator (Army)	0.800	0.860	0.380	
An end-of-service-life indicator (ESLI) has been developed for chemical, biological radiological, nuclear (CBRN) protective mask filters that will alert the user to exchange the filter following exposure to acid-gas chemical warfare agents (CWAs). The technology to be transitioned consists of thin colorimetric indicator films coated with pH sensitive dyes and reagents that target common functional groups and chemical properties of the major classes of blood agents and select Toxic Industrial Chemicals (TICs). The approach is to place the ESLI along the inside wall of the filter in contact with the carbon bed so it can react with the passing agent wave front to produce a color change, thereby alerting the user to replace the filter well before its gas-life capacity is depleted. Program Outputs and Efficiencies: The Joint Service General Purpose Mask (JSGPM) CBRN filter housing will be equipped with a transparent plastic window to view the indicator response. The ESLI will be designed to provide a visual signal when approximately 20 to 60 percent of the filter's service life capacity is expired, depending on the target agent. The ESLI technology will be transitioned to the M50 JSGPM acquisition program as a spiral upgrade (product improvement) to the current primary CBRN filter. TTI funding accelerates this transition by one year. *FY 2008 Accomplishments:* This project completed JSGPM ESLI filter design and begin prototype fabrication.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This project will hold a Critical Design Review, complete the fabrication of final ESLI filter prototypes, and begin final prototype test and evaluation. *FY 2010 Plans:* This project will complete test and evaluation, hold Transition Readiness Evaluation review, complete Engineering Change Proposal, and submit for joint service approval.				
Medium Caliber Cartridge Improvements using Micro Electro-Mechanical Systems and Direct Write Explosive Ink 40 mm M433 and M430 cartridges have been in service since the 1950's and 1970's respectively, and are used with the M203 and MK19 by all services. Both use point detonating fuzes with mechanical safe and arm devices which do not reliably detonate on soft impact targets or high graze angles. The objective of this effort is to incorporate a Micro Electro-Mechanical Systems (MEMS)-based Safe and Arm (S&A) device with automated explosive loading technology into current 40mm combat cartridges. Outputs and efficiencies: incorporate impact sensors that will sense initial impact and electronically send a signal to initiate the explosive train for improved lethality and improved reliability on soft targets (from 50 percent to 90 percent), and also significantly reduce the number of duds on the battlefield and training ranges. The MEMS S&A will also require less volume which will allow room for improvements in lethality or other future alternate applications. This Technology Transition Initiative accelerates transition of this technology by approximately three years. *FY 2008 Accomplishments:* This project performed modeling of fuzing and explosive train in a gun launch environment and incorporated MEMS S&A design into fielded system (current cartridge design). *FY 2009 Plans:* This project will build inert demonstration units to verify MEMS survivability of MK19 cycling/firing and conduct laboratory safety evaluation on micro-scale firetrain.	0.750	1.376	3.696	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: This project will initiate verification hardware build and conduct test and evaluation on prototype high explosive cartridges, complete verification hardware build, conduct independent assessment, qualify fuze, and perform evaluation which will result in changes to technical data package.				
Tactically Integrated Sensor (TIS) (Navy)	2.767	2.753	0.000	
This project was previously titled “Naval Expeditionary Combat Command Tactical Command & Control” in the FY 2009 President’s Budget. The Tactically Integrated Sensor project provides the ability to protect the last miles of the Sea Lanes of Communication. The specific objectives of the project are to support US Forces in an area of heightened vulnerability from surface, air and subsurface attack; protect merchant shipping and maritime infrastructure; and quickly assess the extent of the threat for the Naval Coastal Warfare (NCW) Commander. Output of the project will provide an integrated family of surface, air and subsurface sensors for persistent intelligence, surveillance and reconnaissance which is fundamental to the NCW mission. The program completion date is 30 September 2009. *FY 2008 Accomplishments:* This project built: 1) Spiral one NECC Tactical C2 software, modified Regional Maritime Awareness Capability Joint Concept Technology Demonstration baseline software to incorporate unique NCW detection, tracking, and direction of maritime traffic capabilities; 2) Integrated NECC Area of Responsibility tactical sensor data (including surface search radar, Automatic Identification System, Electro Optic/Infra Red, air beacons and acoustic sensors) and communication links into a single integrated commander's combat system; 3) Employed Service Oriented Architecture that facilitates the users to publish and subscribe to other data sources across US Navy and coalition combat and command and control systems and provided Tactical Decision Aids to aid the users in the detection, identification, and interdiction of contacts of interest; and 4) Procured environmentally packaged expeditionary computer systems.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: This project will; 1) Build spiral two software to process, correlate and de-conflict multiple and dissimilar sensor types data, present as a consolidated combat system picture; 2) Integrate small high speed surface vessel detection and tracking into the combat system; 3) Integrate additional capabilities to detect and track swimmer/diver delivery vehicles, and provide capability to the combat system to detect and track aircraft; and 4) Demonstrate the spiral two hardware and software suite during Seahawk 2009 Anti-Terrorism Force Protection exercise.				
Solid State Laser Ignition (Army)	1.153	1.376	0.652	
The Solid State Laser Ignition System replaces the primer feed mechanism (PFM) and primers used in the 155 mm M777 family of towed howitzers. The current PFM ignition system is complex and high maintenance with known operational issues due to mechanical jamming of the PFM and premature firing due to primer sensitivity. This solid state laser ignition system increases system safety by eliminating the manufacture, storage, resupply and demilitarization of explosive primers and reduces system costs associated with the logistics and maintenance required with primers and primer feed mechanisms. Outputs and efficiencies: (1) an integrated design for M777 application where major risk areas have been mitigated or managed; (2) hardware availability to verify the design in system tests; and (3) a comprehensive assessment of the technology to support a production decision and an operational evaluation of its readiness for field insertion. This solid state laser ignition effort will yield a system prototype and will accelerate the availability of this technology for fielding by four years. *FY 2008 Accomplishments:* This project: 1) Integrated baseline review (IBR) and system requirement review (SRR) were conducted; 2) Preliminary design and risk mitigation activities initiated; 3) Gun shock and vibration (S&V) and thermal data collected to baseline requirements for laser ignition components; 4) Chamber window surrogates designed and fabricated to evaluate design concepts and window cleaning procedures; 5) Analysis of M777 hardware changes to verify their structural integrity and overall suitability were be performed.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Preliminary design review (PDR) and critical design review (CDR) will be conducted. Risk mitigation, preliminary design and detail design activities will be completed and an integration concept will be developed from system trades which focus on minimizing the operational impact of converting from a primer based to a solid state laser ignition system on the current M777 family of towed howitzers. Pre-prototype hardware will be fabricated and qualified by subsystem tests. Hazard analyses and safety assessments will be performed in preparation of system test and live fire evaluation. *FY 2010 Plans:* System test readiness review (TRR) will be conducted. Prototype hardware will be fabricated and system test and evaluation will be completed. Improvements to the prototype hardware design will be captured in the solid state laser ignition Technical Data Package. Manufacturing and technology readiness assessments will be performed. Final prototype hardware for limited user testing (LUT) will be delivered in advance of the production decision.				
Tactical Idle Reduction Equipment for Heavy Tactical Vehicles (Army) This project develops and equips a suitable auxiliary power unit (APU) and auxiliary environmental control unit onto the next-generation M915 and family of next-generation long haul Heavy Tactical Vehicles (HTV's). Excessive fuel consumption for this fleet of vehicles has been attributed to significant idling, during which the vehicle is parked but the main engine is left running to meet power and energy demands. The idle reduction equipment developed under this effort would enable M915 operators to disable the main engine while maintaining power and environmental control capabilities, thereby conserving 66 percent of the fuel currently being consumed by the fleet during parked operations. Outputs and efficiencies: 1) Fabrication of an APU and integration onto the M915 platform; 2) Demonstration of power quality utility class 2C conformance per Department of Defense Military-Standard-1332B, protective device functionality verification, and validated environmental control per American Society of Heating Refrigerating and Air-Conditioning Standard 37. Additionally, operational testing of integrated idle reduction equipment will be performed to demonstrate that they can be integrated with the M915 to fit its maintenance and operational schedule without any adverse effects. These tests	1.730	1.950	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
include demonstration of maintenance ratio less than 0.0025, demonstrated reliability comparable to the M915 (mean time between hardware mission failure of 8,600 miles), and conformance to survivability metrics for shock, vibration, sand, water-immersion, hot/cold environmental, altitude testing. TTI funding accelerates the transition of this capability three years. *FY 2008 Accomplishments:* This project conducted power and energy assessments of the fielded fleet of long haul trucks and developed and demonstrate stand-alone prototypes of the auxiliary power unit (APU) and auxiliary environmental control unit. *FY 2009 Plans:* FY09 plans are to: 1) accomplish test and evaluation on stand-alone auxiliary power unit (APU) and auxiliary environmental control unit prototypes; 2) Implement any needed engineering changes to the prototypes discovered during developmental test or the power assessment, as appropriate; 3) Down-select to a single idle reduction equipment supplier, and integrate prototypes onto M915 platform; and 4) Perform advanced technology demonstration and maintenance demonstration of fully-integrated platform for Program Manager (PM) HTV.				
Weapons Decision Support System (Navy) Weapons Decision Support System (WDSS) provides intelligent agent decision support for weapon availability, strike up time, weapons choices and weapon inventory Underway Replenishment (UNREP) and offload planning onboard carriers. WDSS system manages weapons current stowage location, weapons peculiar attributes, breakout and build support requirements, status of the carrier's weapon elevators, potential strike-up path hindrances, alternate weapons availability, and breakout to delivery time forecasting. WDSS employs expert systems and intelligent agents to collect, interpret, and process the information into a knowledge base which can be used to support and automate the decision making processes associated with weapons planning. WDSS will function as a component of Aviation Weapons Information Management System (AWIMS) that will interface with or receive data from other systems such as, Load Plan generator, Ordnance Information System (OIS), Magazine Arrangement Planning Aid	0.620	0.688	0.000	

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Internet (MAPA-I), and other related systems to provide weapon system attributes during planning and execution of the aircraft load plan. Outputs and efficiencies: WDSS shortens the time to plan initial ship load-outs and fulfill replenishment requisitions by 50 percent and improves availability of weapons asset availability information following replenishment by 30 percent. WDSS increases survivability; less bombs are required to be staged on flight deck (stage only two events in advance vice three-five events in advance). Higher mission-capable sortie rate, additional 18-25 sorties from faster planning, mission flexibility and tracking under WDSS. TTI funding accelerates the transition of this capability by two years. *FY 2008 Accomplishments:* Pilot systems were upgraded and integrated with Aviation Data Management Control system (ADMACS). Weapons planning and operation intelligent agents modeling and rules were completed. *FY 2009 Plans:* Planned integration testing with the ADMACS architecture and AWIMS integration testing. Plan to incorporate WDSS into ADMACS Block 2 for shipboard testing and fleet delivery under ADMACS Block 2.				
XM312 .50 Caliberr Lightweight Machine Gun (SOCOM) The XM312 is a 34 lb., .50 caliber machine gun that fires open bolt and out of battery with an internal recoil buffer. The XM312 system supports the VC Joint Chiefs of Staff memo, Most Pressing Military Issues Approval. Joint Force Projection Issues are addressed given this new capability allows SOF to man-carry a lightweight, lethal .50 caliber weapon to locations otherwise inaccessible to current forces. Joint Force Sustainment Issues are addressed by minimizing ammunition consumption as a more controlled weapon facilitates full target engagement with fewer rounds. The XM312 is capable of being mounted on any land, sea, or air platform due to its size, reduced weight, and recoil. This addresses interoperability within the Joint Capability Areas. The XM312 will be procured by USSOCOM and integrated into the Family of Special Operations Vehicles, specifically the RG-31 and RG-33 Medium Mine Vehicles as well as USSOCOM's Light Tactical Vehicles.	1.730	1.147	0.000	

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Outputs and efficiencies: 1) 66 percent less recoil force than the M2 MG, which contributes to better accuracy and more weapon controllability; 2) lighter weight (50 percent less weight than the M2 machine gun: less than 53 lbs verse 128lbs for the M2); increased accuracy and controllability, which contribute directly to reduced ammunition consumption and increased combat effectiveness/lethality, and soldier survivability. USSOCOM sees the XM312 as a replacement for all M2's in its inventory and expanding the capability the XM312 provides to all units and mobility platforms. *FY 2008 Accomplishments:* This project: 1) Designed and completed the integration of a new M9 link feed system into the XM312; 2) Conducted Contractor Verification Test (CVT) with current prototype hardware; 3) Produced three Engineering Test Units to further support reliability testing, Technology Readiness Assessments, as well as conducted a SOF Limited User Test (LUT) in order to formalize the Capabilities Development Document (CDD); and 4) Attained a successful Milestone-B decision. *FY 2009 Plans:* Planned completion of development and preparations for Low Rate Initial Production.				
Battlespace Terrain and Reasoning Awareness Battle Command (BTRA-BC) (Army) BTRA-BC transitions terrain, atmospheric and weather analytic Tactical Decision Aids (TDAs) in support of Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR). TDA software for transition operates at two levels: 1) TDAs that operate over large data sets to create actionable information of the effects of the terrain, atmosphere and weather on units, tactics, ground and air platforms, systems and sensors and the soldier and 2) TDAs that perform mission and task level analysis in support of the Military Decision Making Process (MDMP), planning, Course of Action Analysis (COA), asset management and execution monitoring. Specific TDAs developing actionable information address topics of: 1) Observation and Fields of Fire, Cover and electro-optical concealment, Obstacles, Key Terrain and Avenues of Approach, 2) platform mobility and unit maneuver incorporating weather effects, 3) interactive graphs representing maneuver potential and battlefield geometry, 4) Tactical Spatial Objects for varying military tasks, 5)	0.000	1.200	0.000	

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Infra-red, Acoustic and Seismic sensor performance, 6) atmospheric and weather effects on UAV mobility and performance. TDAs addressing MDMP activities support: 1) Interactive, MapQuest-like mission constrained ground and air platform routing, 2) ISR asset management, 3) ground and air asset synchronization and 4) battlefield effects. All products are designed for visualization and input to other automated Battlefield Operating Systems (BOSs). BTRA-BC transitions a geo-Battle Management Language (geoBML) supporting semantic and syntactic interoperability between Army and Joint systems via the Joint Consultation, Command and Control Information Exchange Data Model (JC3IEDM) required by Army and USMC systems.. Each year, BTRA-BC will transition various data analysis and decision support tools to: 1) National Geospatial-Intelligence Agency's (NGA) Commercial Joint Mapping Toolkit (CJMTK), supporting 207 approved Joint Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) programs, 2) the Digital Topographic Support System (DTSS) supporting the Current force of the Army at Division and Brigade Combat Teams via CJMTK, 3) Distributed Common Ground System Army via CJMTK and 4) the Army's Future Combat System via CJMTK. *FY 2008 Accomplishments:* This project completed or initiated the following tasks: 1) Common, Joint Battle Command software tools and services ensuring consistent, actionable information from terrain and weather analysis, enabling shared awareness, empowering predictive analysis and providing a common geo-environmental basis to the Common Operating Picture (COP) or Common Relevant Operating Picture (CROP) providing an increase of 3 times in the number of Courses of Action (ground maneuver forces) that can be considered during mission planning and predictive tactical advantages across both unfamiliar and familiar terrains improving force, sensor and asset management and synchronization given terrain and weather effects; 2) Initial capability to share actionable, C4ISR relevant, geospatial information with Army and Coalition partners via the extension of the Joint C3 Information Exchange Data Model (JC3IEDM); and 3) Defense Information Systems Agency (DISA)/Global Information Grid (GIG) compliant analytic software services. Efficiencies:				

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1) Software reuse: Transitions via NGA's Commercial Joint Mapping Toolkit (CJMTK) make the software tools available to over 207 approved Joint C4ISR programs and operational on military systems using either Windows, Solaris (Unix) or Linux operating systems. 2) Common integration and use of tools and products. CJMTK will provide, for the 1st time, reference implementation guidance regarding software, services and resulting product interaction using the JC3IEDM. 3) Single approach to interoperability across Joint and Coalition Systems for geospatial Battle Command Information. 4) Early risk mitigation. Accelerated transition allows the Army's Future Combat System and Distributed Common Ground System-Army (DCGS-A) and Digital Topographic Support System (DTSS) to evaluate and adopt design methods, procedures and processes in early spirals of development. *FY 2009 Plans:* Planned tasks in FY09 are to transition six (6) decision support tools, aggregated services and data/ information models for incorporation in the Army mandated Joint C3 Information Exchange Data Model (JC3IEDM). Outcomes: (1) Common, Joint Battle Command software tools and services ensuring consistent, actionable information from terrain and weather analysis, enabling shared awareness, empowering predictive analysis and providing a common geo-environmental basis to the Common Operating Picture (COP) or Common Relevant Operating Picture (CROP); (2) Extended capability to share actionable, C4ISR relevant, geospatial and weather information with Army and Coalition partners via the extension of the Joint C3 Information Exchange Data Model (JC3IEDM); and (3) DISA compliant analytic software services.				
Precision Fires Image Software Suite Handheld Capability (Navy)	0.000	1.413	1.522	
Currently Overseas Contingency Operations (OCO) missions on the ground are planned using traditional means and require dismounted operators, (conventional and Special Operations Forces), who do not carry laptop computers. The mission set is currently supported by paper. The objective of this program is to integrate Battlespace Awareness (Mission Planning, Force Protection, Direct Action, etc.) capability on a				

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Windows CE/mobile handheld computer by building upon already proven and deployed technology. The availability of these software tools on a handheld computer will immediately advance warfighter capabilities by enhancing situational awareness, precision targeting, and rapid employment at the tactical level. Program Outputs and Efficiencies: This program will generate and transition a software suite that provides image, video, and geographical capabilities on the Army's Pocket Sized Forward Entry Devices (PFED) and compatible Special Operations Forces Windows CE/mobile handheld computers. These forward operating Battlespace Awareness applications will be built around the previously transitioned and deployed Precision Fires Image (PFI), which is a National Geospatial-Intelligence Agency (NGA) validated, CENTCOM approved, image based targeting tool for coordinate-seeking weapons. Integration to the handheld computer will be advantageous in achieving advanced mission capability with less weight, space, and provide shorter operational readiness delays. The TTI funding will accelerate the acquisition and integration of this handheld software capability by two to three years. *FY 2009 Plans:* The first year will focus on: 1) Gridded Reference Graphics (GRG's), Collateral Damage Estimation (CDE); 2) Importing route capability; and 3) Inclusion of the Combatant Commander's No Strike List. This will provide: 1) The capability to use Windows XP/Vista computers to generate PFI's from any image (i.e. commercial satellite, global hawk, national systems) that has the meta-data required to support coordinates so that missions can be run using a variety of images; 2) Provide basic graphics and drawing capability to any 3rd party application by generation of a generic shared object module on the CE/Mobile devices; and 3) Work directly with dismounted users (Special Operations and Conventional Forces) during a series of events and before deployment to inject advanced capability and Tactics Techniques and Procedures (TTP's) designed to save lives and successfully prosecute Overseas Contingency Operations (OCO) missions. Technology will be transitioned on a six-month cycle with enhancements integrated into the PFED baseline based on blocking cycles and integrate with an initial Program of Instruction (POI) at each services schoolhouse				

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FY 2010 Plans: The second year will focus on Battlespace Awareness directed at specific mission sets, which include Direct Action (DA), Leadership Interdiction Operations (LIO), Mobility and Force Protection (FP). Work in a six month transition cycle, testing capability with scheduled exercises, and working with the instructors and schoolhouses.				
Magneto-Rheological (MR) Fluid Suspension System for Stryker (Army)	0.000	2.283	1.957	
The objective of the project is the direct replacement of the Stryker Family of Vehicles (FoV) passive suspension system with the Magneto-Rheological (MR) Fluid Semiactive Suspension System during the Stryker Modernization Program (S-MOD). The MR Suspension System significantly reduces shock and vibration levels, improves vehicle mobility and handling, and improves chassis stability, thereby improving crew responsiveness during target acquisition and engagement as well as improving firing accuracy for the Mobile Gun System (MGS). The TTI effort will accelerate the integration activity to the Stryker fleet by 8-12 months. Program Outputs and Efficiencies: The MR Suspension technology is low risk and will provide outstanding vehicle performance, including cross-country speed improvements up to 72 percent, vehicle hull shock and vibration reductions up to 60 percent, a 30 percent improvement in vehicle handling stability, and greater than 50 percent improvement in firing accuracy. The MR suspension improvement in ride performance will also reduce operator fatigue, thereby increasing crew sustainment and operational effectiveness. *FY 2009 Plans:* 1) Tank-automotive and Armaments Command (TACOM) Life Cycle Management Command (LCMC) Assessments, Test Plans, and Reports: procure contracts, solicit cost estimates and test plans from government testing facilities and generate reports of each of the following testing phases. 2) Design Iteration and Analysis: augment the Wheeled Vehicle Power and Mobility Advanced Technology Objective – Development (ATO-D) for system/subsystem design iterations and analysis. 3) Subcomponent Endurance Testing: perform a design iteration of the current damper hardware and develop subcomponents of the newly iterated design using the predetermined Stryker Mission Profile provided by the Program Management Office for the Stryker Brigade Combat Team (PMO SBCT). 4)				

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Component Endurance and Environmental Testing: perform endurance testing of the newly iterated MR damper design using the predetermined Stryker Mission Profile provided by PMO SBCT at both ambient temperature and also in a cold chamber to determine the durability of the system. 5) Full Vehicle Endurance Simulation Testing: develop and install a full vehicle set of MR dampers for a Stryker vehicle, which will be provided by PMO SBCT, for the purpose of endurance testing the vehicle *FY 2010 Plans:* Perform a full vehicle Reliability, Accountability, and Maintainability (RAM) test using the Stryker Mission Profile provided by PMO SBCT at Yuma Proving Grounds (YPG).				
Polymer Light Emitting Diode (PLED) Identification of Friend or Foe (SOCOM) United States Special Operations Command users currently lack adequate, mutually recognizable, and intuitive IFF systems that are accepted and interpreted across the command. An improved IFF system is required to mitigate potential friendly fire incidents within Special Operations Forces (SOF). The objective of this project is implementation of a next generation IFF system incorporating PLED technology for laser interrogated response visible only to Generation III Night Vision Goggles (NVGs). This Technology Transition Initiative (TTI) will accelerate the program by 12-18 months. In addition to programmatic acceleration, TTI funding will enable acceleration in manufacturing and production of PLED emitters. Program Outputs and Efficiencies: The Program will deliver significantly enhanced IFF capability providing an IFF emitter visible to GEN III NVGs operating in the near-IR spectrum and initiated only by modulated military laser interrogators (AN/PEQ-5). The effort will focus on developing brighter PLED material with extended emission range, improving efficiency of the system through integration of flat-cell batteries, and development of a streamlined, flexible form-factor that meets user requirements. *FY 2009 Plans:* The project will develop and deliver: 1) Spiral 1 PLED IFF Tag prototypes (100 units); 2) Limited user assessment of the Spiral 1 prototypes; and 3) IFF Annex to the Special Operations Personal Equipment Advanced Requirements (SPEAR) Operational Requirement Document (ORD).	0.000	0.978	0.304	

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FY 2010 Plans: This project will develop and produce 200 Spiral 2 Prototype IFF PLED Tags based on user defined modifications generated during the FY 2009 user evaluation and requirements development process and conduct an Operational Test to support a Military Sealift Command decision and potential initial operating capability (IOC) in June 2010				
155mm M107E1 1M Training Projectile (Army) The objective of this program is to provide artillerymen with a safer, combat-representative, less expensive, 155mm training round that would be Insensitive Munitions (IM) compliant. This new training round replaces the 155mm M107 high explosive (HE) wartime reserve projectile that is currently used with one that has the look, feel and flight characteristics of the wartime M795 HE projectile. The plan including reutilization of M483 shell bodies (from the M483 demilitarized (DEMIL) effort driven by End-of-Life and Cluster Munition Elimination policy issues) and utilize the IMX-101 Extremely Insensitive Detonating Substance (EIDS) explosive formulation (a non-TNT formulation leveraged under an ongoing FY2008 TTI project) to produce the M107E1 projectile. TTI funding accelerates the transition of this project by one year. Program Outputs and Efficiencies: 1) Reduces the Hazard Classification (HC) of training projectiles from the current HC of 1.1 up to an HC 1.6; 2) Alleviates logistics chain strain by reducing the safe distance from 1250 to 172 feet per 10,000 lbs; 3) Enhances training by more closely replicating the operational capability; and 4) Improves soldier safety during training. *FY 2009 Plans:* In FY09 this project will baseline the final design and perform qualification testing which would support a Milestone C Type Classification and load and test the projectiles according to Hazard Classification testing requirements given in TB700-2 (the IM requirements in MIL STD 2105C).	0.000	2.065	0.000	
Transition Initiatives	0.000	1.375	15.698	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The Annual Call for Technology Transition Initiative Proposals will be released in the January/February for response by April, and OSD review, prioritization and selection during the June/July timeframe. A listing of initiatives under review for selection by OSD can be provided to congressional staff members during the budget review. *FY 2009 Plans:* Selection of one additional project for execution in FY 2009 is pending from among competing projects, but priority at the time of this submission is the USN Jamming Tactical Air-Launched Decoy (JTALD) Expendable Electronic Attack Payload, which increases aircraft and weapon survivability within the jamming corridor it creates. *FY 2010 Plans:* Transition initiatives validated but pending final review and selection for FY 2010 execution include the following projects: 1) Height-of-Burst (HOB) Sensor for Hellfire P++ (improved lethality); 2) Next Generation - HELLFIRE II Captive Carry Health Monitor (NG-CCHM) (reduces Mx costs; supports increased OPTEMPO); and 3) Secure Cross-Domain Mission Planning using the Trusted Services Engine (TSE) (increases sortie generation rate and the effectiveness of those sorties). These projects will be supplemented by the FY 2010 Annual Call for TTI Proposals. Approximately 48 percent of FY2010 program funds are expected to be dedicated to funding tails from prior year projects, providing the remaining approximate 54 percent to support FY 2010 Transition Initiative selections. A listing of initiatives under review for selection by OSD can be provided to congressional staff members.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

QRF/RRF: Program completion and success will be monitored against program schedule and deliverable stated in the proposals.

Exhibit R-2a, PBR 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603826D8Z Quick Reactions Special Projects (QRSP)	**PROJECT NUMBER** P829

TTI: In FY 2008, initiated the new start of 14 projects and concluded the activities on many continuing projects with the result of 9 technologies transitioning to the warfighter.

In FY 2009, initiate the new start of 5 projects and conclude the activities on many continuing projects with the result of at least 13 technologies transitioning to the warfighter.

In FY 2010, initiate the new start of 12 projects per year and conclude the activities on many continuing projects with the results of 11 technologies per year transitioning to the warfighter.

RRF: In FY 2008/FY 2009/FY 2010 RRF investment decisions are made during the execution years in response to combatant commander requirements and new threats/new opportunities.

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Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603828D8Z Joint Experimentation

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	103.853	108.777	124.480						Continuing	Continuing
P808: Joint Experimentation	103.853	108.777	124.480						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Experimentation (JE) Program funds Department of Defense efforts to explore future joint and coalition force attributes and structure, to ascertain gaps in current joint force capabilities, to influence Department force development and employment policy, and to examine potential solutions for joint requirements through targeted Doctrine, Organizational, Training, Materiel, Leadership and Facilities (DOTMLPF) improvements. JE serves as centerpiece and balancing investment to a broader Defense experimentation enterprise inclusive of investments by Military Services and Defense Agencies. Office of the Secretary of Defense oversight emphasizes disciplined design and cost control of individual projects, and on achievement of meaningful results that can be assessed with metrics based on incremental force improvements. Defense experiments address wide-ranging joint issues and opportunities registered by the Combatant Commands, Services and defense Agencies through the Warfighting Challenge process. The community of Defense Experimentation and operational customers work with OSD and USJFCOM to set priorities for this process. In the larger scheme of Defense capability development, JE naturally flows from operational analysis, identifies potential capability gap remedies and explores the feasibility of force enhancements. By exposing potential shortfalls and exploring opportunities, JE is essentially an early risk mitigation tool preceding force capability investments. In addressing these validated needs, close alignment and synchronization with Service/Agency wargaming and experimentation efforts are essential for efficient funding leverage and for effective transition of joint experimentation outcomes into improvements for forces deployed to support joint missions. Management initiatives in FY09 redress an investment reserve for emerging experimentation needs of Combatant Commands in the current funding year. Funding efficiency is pursued by emphasizing USJFCOM as the primary provider of Modeling and Simulation (M&S), networked scenario distribution, and analysis services.

USJFCOM leads, coordinates and integrates the Department of Defense's (DOD) Joint Concept Development and Experimentation (JCD&E) Program, a major element of the RDT&E-funded Joint Experimentation Program. JCD&E is executed through an enterprise approach which focuses, prioritizes, synchronizes, and conducts experimentation work within DoD and with key USG partners. Flowing from Office of the Secretary of Defense (OSD) JE policy guidance in the Guidance Development of the Force (GDF), JE addresses key developmental and remedial capabilities responding to current and future security challenges. By applying concept development and analysis-based experimentation to concepts and proposed capabilities in the context of near-term and projected future conditions, JE provides essential insights and a range of potential solutions to current warfighting efforts and future force development. The JE Program funds the JCD&E process and individual Combatant Commander experimentation initiatives to develop the foundation for new and improved joint military concepts and capabilities.

Joint experimentation concepts are informed by current lessons learned and experimentation. In FY 08, the JCD&E effort led by USJFCOM delivered the military contribution to Cooperative Security Joint Operating Concept and Strategic Communications Joint Integrating Concept, and laid the foundation for the delivery in FY 09 of a revised Capstone Concept for Joint Operations (CCJO), the Chairman's foundational document that describes how the future joint force will operate in an uncertain, complex and changing future characterized by persistent conflict. The revised CCJO will guide development and employment of the future joint force, and set the stage for development of the supporting concepts in FY 09 and 10. In turn, these supporting concepts will identify capabilities the joint force commander will need to operate under the changing conditions outlined in the CCJO.

In FY 08, a number of important capabilities were transitioned via the JCD&E efforts to CoComs, service and agency force developers, and acquisition authorities for delivery to the joint force. These capabilities include the framework for processes, function and structure of the new USAFRICOM staff, and a draft Rule of Law planning framework for combatant commander staffs delivered to USEUCOM, USAFRICOM, USCENTCOM and USSOUTHCOM. In addition, NATO Logistics Functional Services, Logistics Information Management Group (LOG FS IMG) and the Chairman of the NATO Data Management Sub Working Group (DMSWG) adopted the Information Requirement (IR) expansion methodology developed under the MNE5 Logistics project. This methodology will serve as the baseline for integrating both legacy and future national and NATO information systems under the NATO Logistics Functional Services Capability Package.

In FY 08, USJFCOM completed several key experiments, including Noble Resolve, which delivered homeland defense and disaster response solutions to military and civil agencies from national to local level. Responders were able to employ several of these solutions in response to natural disasters that occurred in the United States. In FY 09 and 10, experimental partnerships will address homeland defense warfighter challenges identified by Northern Command and informed by concept development work on integrating concepts developed for the CCJO. Experimentation with the Department of State and civilian agencies developed and evaluated interagency planning and coordination frameworks for whole of government crisis response. The results of Unified Action '08 set the stage for delivery in FY-09 of Commander's Handbooks in numerous sectoral areas for use by the Joint Force Commander to assess conditions and to provide planning frameworks to support the delivery of critical services to host nations as part of a integrated whole of government approach. FY 09 and 10 experimentation will include work on critical warfighter challenges such as full spectrum awareness, strategic lift and logistics in support of national objectives, cyber space, communications for battle space awareness, missile defense, and command and control that integrates joint, service, interagency and multinational processes for rapid and flexible response.

Joint experimentation and service experimentation are complementary efforts. Joint experimentation focuses on the needs of the Joint Force Commander; Service experimentation focuses on military forces flowing through component commanders that the joint force commander will employ. The robust collaborative planning of joint and service experimentation, ensures that joint context, concepts, and anticipated capabilities are effectively integrated into service experimentation as appropriate. In FY 09 and 10 , joint war fighting challenges will be addressed in joint and service experimentation, and capability solutions will be analyzed and defined in a collaborative process.

Joint experimentation differs from joint exercises in that experimentation seeks innovative alternatives for future forces while joint exercises prepare and test the readiness of today's forces for today's challenges in the existing environment. Experimentation vets and validates and focuses primarily in the out years; exercises

test units and are concerned with today's operations. In FY 09 and 10, joint experimentation will exploit opportunities presented by joint exercises to the extent that experimentation does not interfere with joint training conditions or standards so that units attain their exercise objectives. Battlefield experimentation and innovation which has occurred in operational units is captured through lessons learned and actively solicited from deployed units for use in defining DOTMLPF-P solutions for the warfighter challenges. In FY 08, experimental support to operations in Afghanistan included forward a deployed team and reach back capability to support the Joint Force Commander's need for insights on the enemy's political, economic, cultural, social, intelligence, and information systems. In FY 09 and 10, battlefield experimentation will continue to be an important component of joint experimentation on command and control, interagency and whole of government approaches, and integration of intelligence and operations in support of the Joint Force Commander.

A relatively stabile investment projection for the JE Program tends to obscure continuing aggressive efforts to derive greater return on investment for the DoD. From the perspective of OSD engagement and oversight, emphasis will be focused on the following refinements to in influential business model.

- Tracing JE efforts to discriminate changes to joint capabilities.
- Tying JE closer to Department operational analysis & Defense Planning Scenarios.
- Periodically and deliberately redressing balances between near-term critical capability adjustments and long-term capability conceptualization.
- Positioning JE in a larger scheme of overarching capability development that begins with lessons learned and critical analysis, enjoins JE, and progresses through demonstration, acquisition, and training.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	107.240	114.947	117.571	
Current BES/President's Budget	103.853	108.777	124.480	
Total Adjustments	-3.387	-6.170	6.909	
Congressional Program Reductions		-6.770		
Congressional Rescissions		-0.600		
Total Congressional Increases		1.200		
Total Reprogrammings	-0.589			
SBIR/STTR Transfer	-2.583			
Undistributed reduction	-0.215			
Other			6.909	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P808, **Collaboration Gateway**		1.200

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**									**DATE:** May 2009	
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603828D8Z Joint Experimentation					**PROJECT NUMBER** P808	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P808: Joint Experimentation	103.853	108.777	124.480						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Joint Experimentation (JE) Program funds Department of Defense efforts to explore future joint and coalition force attributes and structure, to ascertain gaps in current joint force capabilities, to influence Department force development and employment policy, and to examine potential solutions for joint requirements through targeted Doctrine, Organizational, Training, Materiel, Leadership and Facilities (DOTMLPF) improvements. JE serves as centerpiece and balancing investment to a broader Defense experimentation enterprise inclusive of investments by Military Services and Defense Agencies. Office of the Secretary of Defense oversight emphasizes disciplined design and cost control of individual projects, and on achievement of meaningful results that can be assessed with metrics based on incremental force improvements. Defense experiments address wide-ranging joint issues and opportunities registered by the Combatant Commands, Services and defense Agencies through the Warfighting Challenge process. The community of Defense Experimentation and operational customers work with OSD and USJFCOM to set priorities for this process. In the larger scheme of Defense capability development, JE naturally flows from operational analysis, identifies potential capability gap remedies and explores the feasibility of force enhancements. By exposing potential shortfalls and exploring opportunities, JE is essentially an early risk mitigation tool preceding force capability investments. In addressing these validated needs, close alignment and synchronization with Service/Agency wargaming and experimentation efforts are essential for efficient funding leverage and for effective transition of joint experimentation outcomes into improvements for forces deployed to support joint missions. Management initiatives in FY09 redress an investment reserve for emerging experimentation needs of Combatant Commands in the current funding year. Funding efficiency is pursued by emphasizing USJFCOM as the primary provider of Modeling and Simulation (M&S), networked scenario distribution, and analysis services.

USJFCOM leads, coordinates and integrates the Department of Defense's (DOD) Joint Concept Development and Experimentation (JCD&E) Program, a major element of the RDT&E-funded Joint Experimentation Program. JCD&E is executed through an enterprise approach which focuses, prioritizes, synchronizes, and conducts experimentation work within DoD and with key USG partners. Flowing from Office of the Secretary of Defense (OSD) JE policy guidance in the Guidance Development of the Force (GDF), JE addresses key developmental and remedial capabilities responding to current and future security challenges. By applying concept development and analysis-based experimentation to concepts and proposed capabilities in the context of near-term and projected future conditions, JE provides essential insights and a range of potential solutions to current warfighting efforts and future force development. The JE Program funds the JCD&E process and individual Combatant Commander experimentation initiatives to develop the foundation for new and improved joint military concepts and capabilities.

A relatively stabile investment projection for the JE Program tends to obscure continuing aggressive efforts to derive greater return on investment for the DoD. From the perspective of OSD engagement and oversight, emphasis will be focused on the following refinements to the influential JE business model.
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-Tying JE closer to Department operational analysis & Defense Planning Scenarios.
-Periodically and deliberately redressing balances between near-term critical capability adjustments and long-term capability conceptualization.
-Positioning JE in a larger scheme of overarching capability development that begins with lessons learned and critical analysis, enjoins JE, and progresses through demonstration, acquisition, and training.

In FY 08, Office of the Secretary of Defense (OSD) provided policy guidance for JE in the Guidance Development of the Force (GDF), and Combatant Commands, Services, Joint Staff and OSD provided their most pressing warfighting challenges (WFCs) to the nascent JCD&E Enterprise led by USJFCOM. FY 09 will be a transformation year for JCD&E. In FY 09, the joint experimentation enterprise built its portfolio around resolution of WFCs, thereby ensuring focus from the start on DoD's highest joint experimentation priorities in a resource-challenged environment. The result is a balanced portfolio across the Enterprise, designed to address both today's conflicts and the transformation of the future force. In FY 10 , resolution of warfighter challenges and the emerging insights from the Capstone Concept of Joint Operations and its three integrating concepts will drive experimentation. In FY 09, the JE enterprise built its portfolio around resolution of WFCs. In FY 10, resolution of WFCs and the emerging insights from the Capstone Concept of Joint Operations will drive experimentation.

JCD&E projects in FY 08 provided solutions to current operations in the areas of integrated ISR, cross-domain information sharing, joint fires, joint C2 and logistics, and supported force transformation efforts in the areas of shaping, home land defense, multi-national and interagency operations, adaptive planning and irregular warfare. FY 09 and 10 experimentation efforts are organized into Lines of Joint Experimentation (LOJX) which group prioritized war fighter challenges into areas of related or complementary work. This organizational construct facilitates DoD-wide understanding and tracking of planned joint experimentation activities and resulting products and outcomes by matching the Tier 1 Joint Capability Areas. JCD&E work follows seven LOJXs, including: Battlespace Awareness (BA), Building Partnerships (BP), Command & Control (C2), Force Application (FA), Logistics (LOG), Net – Centric (NC) and Protection (P). In addition, in FY 08, USJFCOM employed Community Management and Support to establish the DoD-wide JCD&E Enterprise. In FY 09 and beyond, the Enterprise will continue to contribute to overall DoD JCD&E results.

In FY 09, USJFCOM established an Irregular Warfare Center (IWC), to serve as the USJFCOM Commander's advisor and proponent concerning Irregular Warfare, leveraging current DoD executive agent for Joint Urban Operations responsibilities to achieve increased synergy. The IWC leads and directs the integrated USJFCOM approach with DoD, Multinational and Interagency partners for Joint Force Irregular Warfare (IW) concept development, training, integration, doctrine development, and experimentation to ensure Joint Forces IW capabilities meet Combatant Commander campaign and complex contingency requirements.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Building Partnerships (BP)	30.819	34.688	24.876	
BP is a new LOJX for FY09 (formerly referred to as Shaping & Comprehensive Approach Limited Objective Experiment). Building Partnerships: BP LOJX projects will provide the Joint Force Commander the ability to set the conditions for interaction with partner, competitor or adversary leaders, military forces,				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603828D8Z Joint Experimentation	PROJECT NUMBER P808

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
or relevant populations by developing and presenting information and conducting activities to affect their perceptions, will, behavior, and capabilities. *FY 2008 Accomplishments:* AFRICOM Interagency Mission Analysis -Facilitated interagency mission analysis (IMA) and experimentation to assist EUCOM in determining the necessary roles, mission partnerships, processes and staff structure for AFRICOM's military support to a "whole of U.S. Government" approach to operations and programs in Africa. Products included interim reports from interagency workshops on Public Diplomacy, Rule of Law, Support to Economic Initiatives, Counter-Narcotics & Transnational Crime, Combating Weapons of Mass Destruction (WMD), Development and Conflict Mitigation, Public Diplomacy/Strategic Communication, and Security Sector Reform, and an AFRICOM Interagency Mission Analysis Final Report. Unified Action -Improved the Joint Force Commanders capability to conduct stability and reconstruction operations with other U.S. government agencies in support of the DoD implementation plan for National Security Presidential Directive-44. Working with other U.S. Government agencies, JFCOM supported or delivered planning frameworks, handbooks, guides, CONOPS, and white papers including: -- Provided written input and experimental support to the Department of State Office of the Coordinator for Reconstruction and Stabilization (S/CRS) in developing the U.S. Government Planning Framework for Reconstruction, Stabilization, and Conflict Transformation and the Interagency Management System Operations Guide; --Partnered in interagency effort that produced an Interagency Conflict Assessment Framework (ICAF); --Assisted OSD in producing Ungoverned Areas Whitepaper; --Assisted S/CRS in developing a Post-conflict Elections Guide; --Collaborated with U.S. Army Corps of Engineers to produce metrics for whole of government activities in conflict environments producing a Measuring Progress in Conflict Environments (MPICE) application tool; --Delivered recommendations to National Security Presidential Directive 44 (NSPD-44) Knowledge Management (KM) Working Group and Advanced Technology Capabilities Demonstrations (ACTD) to advance whole of government selection of common operating picture and decision-making support tools.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603828D8Z Joint Experimentation	**PROJECT NUMBER** P808

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Multi-National Experiment 5 (MNE5) -Led an international community of 17 nations, NATO and the European Union in developing a framework to improve coalition partner's ability to conduct interagency and multi-national planning, coordination and execution for contingency operations. Handbooks, architecture, knowledge bases, white papers, and guidebooks were produced, including the following: -- A framework for strategic level planning within a coalition; -- A process for multi-national and inter-agency partners to conduct collaborative analysis (assessment), planning, implementation and evaluation for crisis intervention; --An Information Exchange Architecture & Technology Concept describing information exchange mechanisms in order to support coalition operations to include principles for information exchange as well as supporting architecture and potential technologies; --Documentation of the service oriented architecture (SOA) used to support the experimentation events to include the structure and rules for the technical architecture and identification of technical systems capabilities; -- Supported development of a web based common and neutral information sharing platform for all intervention partners, to include non-government organizations; -- A concept providing the theoretical and generic basis for Knowledge Development in support of future operations by creating a comprehensive, systemic and dynamic understanding of the operational environment to improve situational awareness and understanding to the decision makers. Noble Resolve -Supporting USNORTHCOM and interagency, state and local partners in homeland defense and civil support, the Noble Resolve experimentation series completed experimentation in five key lines of effort: --Information Sharing – Identified tools, processes, and organizational constructs to enable improved speed, accuracy, completeness, and robustness of information exchange and associated decision-making including: --Familiarized Indiana National Guard personnel with info sharing tools that they have adopted and incorporated into their disaster response to the early summer 2008 flooding crisis in that state;				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-- Identified standards and methods that are being adopted to eliminate existing barriers to seamless data sharing between disparate web mapping service tools used by different agencies (DoD, Department of Homeland Security (DHS), etc.); -- Provided feedback on important functionality issues for DHS's Common Operations Picture tool (iCAV) to improve the latest version of this tool suite. --Detect/Identify/Track WMD – Identified for USPACOM tools that could help them detect/identify/ track nuclear & radiological WMD materials within their AOR. As a result, they are now better able to advocate for technology projects and programs of record pertinent to their mission set. In addition, helped USPACOM evaluate various C2 arrangements for use when JTF-Elimination is deployed to that AOR. --Population Movement – Enabled Texas and their FEMA Region VI mission partners evaluate their plans and capabilities for handling a large population movement into that region as a result of a natural disaster. --Maritime Domain Awareness (MDA) – Helped National MDA partners evaluate critical aspects of the National MDA CONOPS. Results will help inform any needed CONOPS revisions. --CBRNE Consequence Management Response Force (CCMRF) Sustainment – Created a model that will enable USNORTHCOM and Joint Task Force - Civil Support to identify critical limitations to their ability to sustain a CCMRF once it is deployed in the field. Cooperative Security Joint Operating Concept (JOC) -The Military Contribution to Cooperative Security (CS) Joint Operating Concept (JOC) describes how future Geographic Combatant Commanders and other Joint Force Commanders will contribute to CS in support of strategic objectives. The JOC will be used to guide the development and integration of future military concepts and Joint Force capabilities for conducting CS. The Secretary of Defense approved the concept in September, 2008. USJFCOM is developing experimentation ICW this concept to promote capability development for FY09 execution. This experimentation can be found in the Building Partnerships LOJX. Strategic Communications Joint Integrating Concept (JIC) -The Strategic Communication Joint Integrating Concept (SC JIC) describes how future Joint Force Commanders could plan and execute joint operations to affect the behaviors of selected populations,				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
governments or other decision-making groups to accomplish the mission and promote broader national interests in a socially complex and globally interconnected information environment. It was developed through a series of collaborative workshops with participation across DoD. Capabilities, tasks, and corresponding measures will be examined through a Capabilities Based Assessment (CBA) led by the CBA sponsor to identify gaps and shortfalls. Final version of the concept will be presented to JROC for approval in August 08. Joint Urban Operations -Developed, in collaboration with the Israeli Defense Forces, draft white papers focusing on the following Irregular Warfare topics: Campaign planning for irregular warfare (USSOCOM lead); Winning the influence effort-the role of strategic communications (U.S. Army TRADOC lead); Understanding the operational environment-Employing ISR in complex environments against a hybrid threat (U.S. Army TRADOC lead); Maneuvering in complex environments (USMC lead); Joint Fires in irregular warfare (U.S. Army TRADOC lead. -Joint Urban Warrior 2008 (JUW 08). USJFCOM/USMC co-sponsored Wargame explored and framed Joint Capability coalition and IA relationships necessary to transition from conflict to stability and support operations. Participants included 18 partner nations, OSD, DOS, USAID, Army, Marine Corps, Navy, Air Force, USSOCOM, JIEDDO COIC, students from the Army and Marine Corps Command and Staff Colleges, and academia. Observations and insights from JUW 08 will be incorporated directly into the training pipeline via Mission Rehearsal Exercises and through distribution of the JUW08 interactive battle book. Networked Urban Operations Test Bed Spiral 2 Experiment improved non lethal effects and crowd behavior modeling and simulation capabilities. Improved capability will model crowd responses to directed energy weapons through federated crowd and entity-level models, providing a simulated venue to experiment on and assess the reactions of virtual large crowds (500+ individuals). Irregular Warfare Development Series -Commenced evaluation and experimentation in support of SOCOM to address the capability gaps for conducting irregular activities as described in the 2006 Quadrennial Defense Review and the Irregular Warfare Joint Operating Concept. Key areas of exploration include: Interagency and international				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
partner collaboration; rebalancing Special Operations Forces (SOF) and General Purpose Forces (GPF) to provide effective Train, advice and assist support to international partners; countering violent extremism; and understanding the dynamic irregular threat changes and the operational environment. Analytic reports were produced to enhance the Joint Force Commander's understanding of these challenges and to identify potential solutions to them. *FY 2009 Plans:* Deployable Security Sector Reform (Progression of effort from previous year) -Deliver validated deployable security sector reform (DSSR) capability for the combatant commander in order to build partnership capacity in this sector, especially partner-nation national level reform spanning the entire DOTMLPF. Key deliverables include a standardized assessment process for the DSSR to determine partner country requirements; administrative tools to enable DSSR team building, employment and follow-up activities; and prototype organizational structures. -Deliver recommendation for development of DSSR capabilities including validated recommendations for specific DSSR authorities to ensure effectiveness and governance, and viability of using Unit Type Codes. Armed Private Security Contractors (APSC) -Deliver a concept of operations defining the Joint Force Commander's authority for integration, command, control and participation of armed private security contractors in the battlespace during future joint operations and will examine unified action among USG departments and agencies, Joint command and control issues, law of war issues, force providing issues and training/doctrine issues with respect to the integration of PSCs in future conflicts. Coalition Networks -Improve the ability of the Joint Force Commander to integrate with coalition operations, by refining policy requirements and standards for information sharing in a coalition environment. - Improved ability to share decision quality information and knowledge, to include situational awareness, throughout a CTF organization by identifying the processes, tools and organizational structure for Coalition Network Operations.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Unified Action -Improve the Joint Force Commanders capability to conduct stability and reconstruction operations with other U.S. government agencies in support of the DOD implementation plan for National Security Presidential Directive-44. FY09 efforts will build on previous work by operationalizing the whole of government planning and implementation processes from the Combatant Commander down to the tactical level. Planned deliverables include: --Identifying and defining the joint force commander's roles and missions for military integration with other US Government departments and agencies in the Interagency Management System, to be codified in a Joint Force Commander's Handbook for Military Participation in the Interagency Management System for Reconstruction and Stabilization. --Developing Joint Force Commander's Handbook's on military support to four distinct sectoral areas in order to identify and define specific military roles and missions in those areas. The sectoral areas include: Rule of Law and Security Sector Reform, Economic Normalization and Restoration, Essential Services and Critical Infrastructure and Governance, Elections, and Media. Multi-National Experiment 6 -USJFCOM will lead a multinational partnership to enable coalition efforts to establish and ensure a safe and secure environment, by developing coalition forces ability to share information, gain situational understanding, synchronize efforts and assess progress in concert with interagency partners, international organizations, and other stakeholders when countering activities of irregular adversaries and other non-compliant actors. Key outcomes for this experimentation include: -- Improved ability of coalition forces to synchronize their efforts during operations against irregular adversaries. -- Improved ability of coalition forces to gain shared situational understanding of the operational environment. -- Improved ability to conduct transitions of authorities and responsibilities during complex operations. -- Improved ability to collaboratively develop and implement a shared information strategy focused on relevant populations (regional or transnational).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-- Improved understanding of the challenges of assuming responsibility for security and other components of governance and their transfer back to host nation control. -The multinational team will develop a variety of capabilities ranging from overarching framework concepts, functional concepts, enabling concepts, and specific capabilities. These capabilities will cover organizational structure, processes, and tools. Cooperative Security (CS) Experimentation -Conduct CS experimentation focus on providing Geographic Combatant Commanders (GCC's) enhanced abilities to develop CS strategies so that they can more effectively develop and execute regional campaign plans for steady-state activities (as required by the Guidance for Employment of the Force) . Strategic Communication (SC) Experimentation -Experimentation that focuses on Joint Force Commanders enhanced abilities to effectively plan, integrate, conduct and assess Strategic Communication to create, strengthen and preserve conditions favorable to joint operations. Support to USSOCOM Irregular Warfare Experimentation -Experimentation conducted to address 6 challenge areas within the Irregular Warfare (IW) Joint Operating Concept (JOC). This experimentation seeks to identify and vet/validate solutions to the IW challenges. Key outcomes for this experimentation include: -- Interagency and International Partner Collaboration: improving information exchange, decision making and effects among interagency and international partners. -- Special Operations Forces (SOF)/General Purpose Forces (GPF) Rebalance: enhanced understanding of GPFSOF requirements for IW, focusing on processes and capabilities needed by DoD/ Interagency to train, advise and assist. -- Countering Violent Extremism: enhanced understanding, processes and capabilities to counter the resonance of violent extremist narratives and ideologies.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-- Refining the Indirect Approach: enhanced understanding, processes and capabilities for indirect approaches, focusing on the specific interagency and international partner operations, actions and activities that comprise indirect approaches. -- Assessing the Effectiveness of IW Operations: enhanced understanding, processes and capabilities to frame operational environments and gather the appropriate local and regional information to assess effectiveness of IW operations. Interagency Shared Common Operational Picture (IA COP) -Identify technologies, processes, organizational structures, and recommend policy changes that will improve the ability to effectively share decision-focused views of the military, interagency, local and multi-national operational environments. Irregular Warfare Concepts Support (IWCS) -JIC development support to USSOCOM resulting in an operational level description of how the future JFC conducts operations to Defeat Terrorist Networks, how the future JFC conducts Foreign Internal Defense/Counterinsurgency, and how to conduct Unconventional Warfare. Stability Operations JOC (SO JOC) -Collaboration with U.S. military services, the State Department's Office of the Coordinator for Reconstruction and Stabilization (S/CRS), the Office of the Secretary of Defense, US Agency for International Development (USAID), and other USG civilian agencies to assess lessons learned as they relate to the future operating environment, will provide development of a JOC that guides capability development for the JFC to be better postured to effectively conduct Stability Operations under the anticipated conditions of the future security environment. "Hybrid Threat" Experimentation with Israeli Defense Force (IDF Exp) -Commanders handbooks will present lessons learned from the entire experimentation effort conducting distributed operations against a hybrid threat in complex environment. -Potential solutions will be captured in the Irregular Warfare Master Plan for management and integration by the IWC.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Building Partnership Capacity JIC -Collaboration to produce a concept that will guide capability development, increasing the JFC's ability to assess and enhance partner capacity to provide Host Nation forces capable of thwarting drivers of instability and increasing operating performance with regional partners. Joint Interagency and Multinational Interoperability for Counterterrorism (JIAMNIC) -Improve counterterrorism operational response time and effectiveness in joint, interagency and multinational situations by developing optimal organizational structures, processes and tools to support integrated operations. -Improve counterterrorism operational effectiveness through developing and documenting specific joint, interagency and multinational de-conflicted roles, responsibilities and Concept of Operations. Regional and Local Population Reaction to US Actions -Improve the JFC's capability to adapt ongoing operations for increased mission effectiveness by developing processes, tools and Concept of Operations (CONOPS) for operational and tactical level forces to observe, assess and predict response and reactions of affected regional and local populations. Humanitarian Assistance & Disaster Relief (HADR) -Improve HADR response time and effectiveness in joint, interagency and multinational operations by developing optimal organizational structures, processes and tools to support integrated operations. -Increased HADR operational effectiveness through developing and documenting specific joint, interagency and multinational de-conflicted roles and responsibilities to enable better command and control and implementation planning and execution. Joint Full Spectrum Operational Capability and Capacity -Improve the ability of the JFC to sustain operations across the full range of security threats including Traditional, Irregular, Catastrophic and Disruptive challenges through increased collaboration and integration of Joint, Interagency and Multinational force command and control. The future JFC will be have the ability to simultaneously conduct operations across the range of military operations in the face of the most likely resource constraints. Joint Global Deterrence				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Improve the ability of the JFC to deter threats against US national interests using the full range of diplomatic, information, military and economic power through developing processes, tools and Concept of Operations (CONOPS) specifically designed for employment against state and non-state actors .				
Battlespace Awareness (BA)	14.533	21.604	25.958	
Battlespace Awareness: BA LOJX projects will provide the Joint Force Commander the enhanced processes, concepts and capabilities to coordinate, synchronize and cue surveillance assets and to process, disseminate and integrate the data collected by those assets across the joint force and to interagency/multinational partners in order to enhance the JFC's ability to understand dispositions and intentions as well as the characteristics and conditions of the operational environment that bear on national and military decision-making. *FY 2008 Accomplishments:* -Produced, with USSTRATCOM's Joint Information Operations Warfare Command (JIOWC), Information Operations (IO) and Joint Intelligence Preparation of the Environment (JPIOE) White Paper J2 as a result of IO/JIPOE Workshops. Paper influenced joint doctrine review of Joint Pub (JP) 2-01.3 (Joint Tactics Techniques and Procedures for Joint Intelligence Preparation of the Battlespace) and JP 3-13 (Information Operations), and provided a framework for the functions and skill sets necessary to support IO within the COCOM Joint Intelligence Operations Centers (JIOCs). -Completed initial, priority segments of the Joint Urban Operations (JUO) Capabilities Based Assessment (CBA) which identified capabilities required to provide battlespace awareness in future joint urban operations. Identified potential doctrine, organization, training, material, leadership, personnel, and facilities (DOTMLPF) alternatives to mitigate or eliminate capability gaps. -Improved Joint Information Operations Center (JIOC) operations by identifying the key characteristics, attributes, roles, responsibilities, and authorities which allowed the establishment of common terms of reference and articulation of specific core process elements of the JIOC FT Concept of Operations (CONOP).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Maritime Domain Awareness (MDA): National Cargo Enterprise Hub Limited Objective Experiments delivered recommendations for refinement of the Cargo Hub and identified procedures to increase joint force commander situational awareness. -Along with OSD, co-chaired the Through The Wall Sensor (TTWS) Focus Team as part of OSD's RADAR Joint Analysis Team (JAT). Defined Focus Team objectives, milestones and deliverables. Recommended future investments in Sense Through Structure (STS) technologies to address military challenges and provided results to the Defense Science and Technology Advisory Group which includes DDR&E and the services. Partners included ONR, DARPA, CERDEC, the Army Program Executive Office (PEO) Soldier, and National Institute of Justice. -Provided Geospatial Analysis and Planning Support (GAPS) software support to units operating in OIF and OEF. GAPS provides the ability to plan and place ISR assets, counter-fire systems, and sensors and can be used to predict likely movement paths through complex terrain. GAPS also supports USAF Force Protection Battle Lab, JIEDDO, and Navy Expeditionary Combat Command mission requirements -Produced an Advanced Analysis White Paper to recommend changes to urban operations intelligence methodology. The advanced analysis methodology produces culturally-specific understanding of the operating environment. The paper is being used as the foundation for an Advanced Analysis Program of Instruction at the US Army Intelligence Center and School at Fort Huachuca, AZ. *FY 2009 Plans:* Joint Integrated Persistent Surveillance Network -Improve joint surveillance asset integration, effectiveness and optimization through the refinement of persistent surveillance capability. This capability will enable more effective operations at the Combatant Commander and the Joint Task Force Commander level. Key products will include a baseline assessment of current surveillance capabilities and integration efforts, and the development of a Concept of Operations (CONOPS) for streamlining the tipping, cueing and communication process between collection assets. -Develop methodology to efficiently and effectively combine and apportion sensors in order to optimize persistent surveillance, to include improved all-weather UAV operations. Joint Force Commander Domain Awareness (JFC DA)				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Improved ability for the JFC to visualize, understand and describe actionable information on current and anticipated situations/conditions, and ongoing and planned operations, including operations when the network is degraded or absent. -A systems-level architecture for actionable domain awareness that is tailorable (scalable and filterable as situation/mission-specific decision support criteria demand) including the ability to support tactical/small-unit operations against irregular adversaries. -Defined roles, responsibilities and processes for improved JFC domain awareness of first the maritime, then the air/land/cyberspace domains. Enhanced Urban Reconnaissance (EUR) -The Joint Force Commander will have an enhanced ability to employ existing and near term capabilities to deny enemy use of structures in the urban environment for cover and concealment. -DoD will be able to accelerate promising mid-term capabilities to close vital gaps in Joint Force Commanders' ability to deny enemy use of structures in the urban environment for cover and concealment. Global Positioning System (GPS) Sustainability -Improved ability to sustain military operations facing GPS degradation due to jamming and spoofing. DoD will be able to accelerate promising mid-term capabilities to close vital gaps in the JFC's ability to conduct joint operations when GPS is degraded or lost. Joint Counterintelligence and Human Intelligence Improved Integration (JCHI2) Refine and develop common processes for the integration of Counterintelligence/Human Intelligence operations. *FY 2010 Plans:* -FY 10 projects will be developed based on Enterprise Warfighter Challenges collected initially in early FY09 and refined in early FY10.				
Command and Control (C2) Command and Control: C2 LOJX projects will provide the Joint Force Commander the ability to exercise authority and direction over assigned and attached forces and resources in the accomplishment of the	18.474	17.389	27.040	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
mission and to share information with higher, adjacent and subordinate headquarters quickly and reliably in order to ensure interoperability and operational agility. The JFC, facing commitment of forces to fight a thinking enemy, must be confident he or she understands the operational environment and can visualize, describe, or direct necessary actions in a timely, trusted fashion. *FY 2008 Accomplishments:* -Coordinated, developed, prioritized, and transitioned Noble Resolve experimentation campaign potential solutions in support of NORTHCOM. Experimentation addressed the active layered defense for the Homeland; the National Incident Management System (NIMS) and National Response Framework (NRF) were used as part of the context. -Demonstrated the capability of the cross domain text chat tool on operational networks with the participation of the Cross Domain Collaborative Information Environment (CDCIE) in the Joint Expeditionary Force Experiment at Langley AFB. CDCIE, a FY08 Joint Capability Technology Demonstration, allowed text chat between users on SIPRNet terminals and a SECRET level coalition network. CDCIE experimentation/demonstration is complete; no further JE investment will be committed. -Addressed the Critical Operational Issues (COI), measures of performance (MOP) and measures of effectiveness (MOE) to define systems capabilities and military utility of the Theater Effects-Based Operations (TEBO) operational planning tool suite Advanced Concept Technology Demonstration (ACTD) through a limited military utility assessment at Exercise Ulchi Freedom Guardian 07. Additionally, collected, identified and generated information to develop a DOTMLPF Change Recommendation (DCR) and gathered data on operational processes to share with COCOMs and operational requirements for future versions of the TEBO tool suite. -Provided support to COMISAF with a Field Experiment and Operational Support characterized by providing products and services to HQ ISAF staff elements. This unique one-year process provided operational support to a war fighting headquarters using experimental capabilities while simultaneously evaluating the value of those capabilities to the war fighter in real time. COMISAF Project Submission Request for Decision Support Tools was received by the SHAPE J5 Capability Management Directorate on 1 Apr 08.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
-Identified the need for combatant commands to identify U.S. and coalition command and control (C2) systems that will be used for the JTF-Elimination (JTF-E), which addresses need for eliminating WMD to effectively integrate and operate. -Improved the ability of the Joint Force commander to share information with multi-national partners, improving the ability of U.S. forces to effectively communicate and collaborate with allies and coalition partners by developing documentation reports, approval letters, assessment plans, and reports for Cross Domain Collaborative Information Environment JCTD. *FY 2009 Plans:* Capstone Concept for Joint Operations (CCJO) -Conduct a three-phased (prepare, execute, and assess) examination of the programmed force by looking at it in the context of the Capstone Concept for Joint Operations (v.3) to identify gaps in capability and capacity of the joint force's ability to meet the challenges of the future operating environment. -Improved understanding of the broad capabilities needed to optimize joint effectiveness and successfully execute joint operations in the projected future security environment. -Identification of capability gaps and proposed options that would balance the joint force to successfully execute combat, security, relief & reconstruction, and engagement joint operations in the projected future security environment. Joint Force Commander Command and Control -Improve the JFC's ability to identify, assess, refine and validate C2 architectures, processes and toolsets that are standards-based, geographically distributed and scalable to include operations in a degraded or no-network conditions. -Improve integration between JFCs and National Headquarters, while harmonizing operations with interagency, multi-national, host nation and other Joint Force partners. -Improve C2 framework for centralized and decentralized decision making to facilitate subordinate commander's initiative and aggressiveness and increase C2 resiliency. . Joint Distributed Operations				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Identify and refine command and control processes and structures (to include over-the-horizon, beyond line-of-sight and on-the-move) and the enabling capabilities necessary to support distributed operations and enable decentralized execution of joint fires and maneuver. -Improve JFC and subordinate commander's ability to share situational awareness of the battlespace enabling both a better understanding of commander's intent and a detailed knowledge of the operating area. Planning, Assessment and Decision Support Systems (PADSS) -Experimentation to enhance decision-aiding technologies and software applications that facilitate rapid and effective operational planning, decision-making, execution and dynamic assessment of combined and joint operations. *FY 2010 Plans:* Global C2 -Improve the JFC's operational effectiveness in joint, interagency and multinational operations by developing architectures, organizational structures, processes and tools to support integrated operational activities including: assessment, situational awareness, planning and execution, resulting in developing and documenting specific joint, interagency and multinational de-conflicted roles, responsibilities and Concept of Operations. Maritime Dynamic Targeting -Improve operational effectiveness of maritime fires operations through development of decision support systems that will enable accurate and timely joint/cross-service fires. -Improve effectiveness of maritime targeting through developing optimal organizational structures, processes, tools and Concept of Operations (CONOPS) to support the integration of maritime forces in the joint fires environment. Maritime Crisis Response -Assess current capabilities and requirements to improve integration of USCG forces into the joint force command and control structure for maritime homeland defense, define specific capability gaps in terms of				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
expected JFC missions over the near, mid and far term horizons as well as generate/identify and validate potential solutions across the range of DOTMLPF-P domains. Airspace Complexity -Improve current capabilities and command and control requirements to conduct all weather, around-the-clock, operations while de-conflicting multiple sources of activity including: military aircraft, potentially hostile aircraft, commercial / civil aircraft, a wide variety of UASs, short-range artillery and ballistic cruise missiles. Space Operations -Improve the GPS and SATCOM jamming resistance by identifying and assessing current and near-term vulnerabilities, identification of technology solutions and developing processes, tools and Concepts of Operations (CONOPS) specifically designed to minimize or eliminate vulnerabilities. -Improve the effectiveness of space force assets by developing optimal organizational structures, processes, and tools to support integrated operations. Distributed Operations -Develop an operational level description of how the future Joint Force Commander conducts: operations to Defeat Terrorist Networks; Foreign Internal Defense (FID) and Counterinsurgency (COIN); Unconventional Warfare (UW).				
Force Application (FA)	8.386	15.486	18.387	
Force Application: FA LOJX projects will provide the Joint Force Commander the ability to integrate the use of maneuver and engagement in all environments to create the effects necessary to achieve mission objectives. *FY 2008 Accomplishments:* -Joint Urban Fires Prototype (JUF-P). Improved joint forces' ability to deliver precision fires in a decentralized manner and in less time than traditional centralized processes. Demonstrated, in a field application, the Joint Urban Fires Prototype (JUFP), expanded target mensuration capability for tactical ground units. Improved joint fires C2 integration and TTPs incorporating automated collateral damage estimation modules into fires systems. Specific products include: -- An Advanced Field Artillery Tactical Data System (AFATDS) Effects Management Tool (EMT);				

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-- Provided precision coordinate generation capability down to the company level. Demonstrated integration of the Digital Precision Strike Suite Scene Matching (DPSS-SM) and Precision Strike Suite - Special Operations Force (PSS-SOF) into Army and USMC fire support team Light Weight Forward Entry Device (LFED); -- Provided precision coordinate generation capability to dismounted operators. Integrated Precision Fires Image (PFI) into commercial handheld devices (lightweight/economical) and into the Pocket-sized Forward Entry Device (PFED)(Army and USMC Program Of Record (POR)) for precision coordinate generation by dismounted operators; --Codified training certification requirements for operators of automated precision coordinate tools by revising CJCS Instruction 3505.01; --Developed a training program of instruction for operators of automated precision coordinate tools; --Developed third party targeting tactics and techniques and procedures (TTP) for employment of Tactical Tomahawk cruise missiles for integration into the Air, Land and Sea Time Sensitive Target multi-service TTP; --Evaluated the specific gaps in employing airborne platform precision coordinate generation to enhance close air support (CAS) capabilities, including field testing of commercial handheld devices in Navy/ USMC air wing CAS and JTAC training. -Standoff Non-Lethal Weapons (NLW) Technology Assessment. Assessed joint requirements and solutions for stand-off non-lethal weapons to stop vehicles, clear buildings, and control crowds, and recommended actions to develop these capabilities. Results provided to Joint Non Lethal Weapons Directorate (JNLWD) and other NLW stakeholders including services, combatant commands, and industry to shape NLW investments. Assessment findings influenced the design of FY08 Directed Energy Weapons and Crowd Modeling experimentation. -Non-Lethal Building Clearing Requirements. Developed and documented ground combat requirements for clearing structures from stand-off distances using non lethal weapons. The work defined the requirements for DDR&E Clear Space Challenge and the FY09 Joint Non Lethal Weapons Program (JNLWP) Technology Broad Area Announcement (Non-Lethal Weapons FY09 Applied Research Efforts). *FY 2009 Plans:* Conventional Warfare (CW) Joint Operating Concept (JOC)				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Develop a conventional warfare joint operation concept that guides capability development for the JFC to be better postured to effectively conduct conventional warfare under the anticipated conditions of the future security environment. Counter-Personnel Warning and Suppression Systems -Identify current and near-term capabilities and develop / validate TTPs to apply escalation-of-force options to employ non-kinetic and non-lethal capabilities to hail, warn, suppress and deny individuals at stand-off ranges on land and in the maritime environment. Cyberspace Operations -Develop and refine concepts and capabilities for joint cyberspace operations focused on developing and improving collaborative planning capabilities, describing and assessing intelligence support requirements, evaluating and refining measures of performance and effectiveness, organizational structure, and identifying and assessing authorities and legal considerations. -Improve the joint forces capability to conduct cyberspace operations with emphasis on integrating and synchronizing computer network attack, defense and exploitation. The joint force will have an improved capability to counter transnational, adaptive and networked adversaries by integrating direct and indirect actions within the information environment, including the internet. Assured Air Access (AAA) -Improve the joint forces ability against the adversarial use of advanced weapons systems capable of disrupting airspace operations using current and near term capabilities. Capabilities will be evaluated to enable DoD to accelerate their development to close vital gaps in the JFC's capabilities. *FY 2010 Plans:* Collateral Damage -Improve JFC capability to conduct offensive operations in areas and environments where collateral damage is unacceptable by assessing and identifying precision strike sensors, weapons, and developing processes, tools and Concept of Operations (CONOPS) specifically designed to minimize or eliminate collateral damage Prompt Global Strike				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Improve the operational response time and effectiveness in executing worldwide strategic and operational strike missions by developing optimal organizational structures, processes and tools to support joint operations. -Increase the operational effectiveness of global strike missions through improved intelligence by developing and documenting specific joint and service de-conflicted roles, responsibilities and Concept of Operations. Forcible Entry -Improve the surface and air distribution capability to ensure the rapid precise sustainment to support the unimpeded maneuver and engagement capability of the Joint Force Clandestine Ground Mobility for Air-Inserted Forces -Conduct experimentation to decrease the time required to field an effective clandestine ground mobility capability through identification of mid-term technological solutions that can be accelerated to fill gaps in the current array of petroleum-based ground vehicles. -Improve the capability to adapt existing doctrine and procedures for clandestine ground mobility requirements by developing processes, tools and Concept of Operations (CONOPS) specifically tailored for use by air-inserted forces. Operational Maneuver from Long Distance -Assess of current capabilities and requirements for operational maneuver from both strategic and intra-theater distances to sustain tactical forces at the point of need, define specific capability gaps in terms of expected JFC missions over the near, mid and far term horizons and identify/generate and validate potential solutions across the range of DOTMLPF-P domains.				
Logistics (Log) Logistics: LOG LOJX projects will provide the Joint Force Commander the ability to project and sustain a logistically ready joint force through the deliberate sharing of national and multi-national resources to effectively support operations, extend operational reach and provide the joint force commander the freedom of action necessary to meet mission objectives.	14.610	6.629	5.408	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2008 Accomplishments: -Drafted DOTMLPF Change Recommendation (DCR), Operationalizing Joint Logistics. Using the Joint Experiment Deployment and Support (JxDS) program in coordination with US Forces, Korea, and the DCR provides the required joint logistics capabilities and organizational options that a commander may utilize to effectively support joint operations. -Multinational Experiment 5 (MNE5) Logistics developed and validated a methodology to expand NATO Information Exchange Requirements. The NATO Information Management Group adopted the methodology as the baseline for integrating both legacy and future information systems under the NATO Logistics Functional Services Capability Package and to guide development of a NATO Logistics Common Operational Picture (LCOP). Drafted the initial version of a multinational coalition logistics guide supporting a civilian-led, comprehensive approach to humanitarian assistance and disaster relief Operations. -U.S. Korea Command (USKORCOM) Transformation: Produced the methodology to develop the Korean theater logistics concept supporting operations to be adopted for 2012. Developed a conceptual logistics framework for the KORCOM J4 organization with its new roles and responsibilities. Completed gap analysis to indentify capabilities to be developed that will optimize, synchronize and coordinate joint theater logistics in the Area of Responsibility. -U.S. Central Command (USCENTCOM): Conducted baseline assessment of theater-specific logistics support processes and began a systematic review/modification of Global Combat Support System processes to develop a logistical common operating picture. Supply class III (fuel) and class V (ammo) were the first two commodities identified for improvements with the DoD IT logistics architecture. Supported CENTCOM J4 with an initial assessment regarding how to structure an enhanced Theater Support Command (eTSC) to effectively manage joint logistics for the AOR. -U.S. Special Operations Command (USSOCOM): Developed a special operations logistics support methodology and framework concept to synchronize strategic and operational level logistics activities for Geographical Combatant Commands (GCC) and their components. This newly developed logistics				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
support methodology will improve the GCC Theater Special Operations Command's (TSOC) ability to effectively plan, execute, and integrate logistics at the operational level for irregular warfare. -- Documented the "As-is" TSOC organizational construct and logistical requirements to determine gaps, redundancies, and shortfalls to allow faster identification of theater irregular warfare logistics requirements and to improve capability to direct theater logistics resources through FY09-10. -U.S. Southern Command (USSOUTHCOM): Enhanced joint logistics support, provided a baseline assessment of theater specific, conventional logistics (J4) roles and responsibilities and developed a joint interagency logistics element (Director for Logistical Support) coordinated and in accordance with a 1 May 08 provisional organization construct directed by CDRUSSOUTHCOM. -- Assisted in reorganization of the logistics directorate in preparation for FY 09/10 final implementation as SOUTHCOM transitions to become Joint Interagency Security Command South (JIASC-S). This reorganization effort will adapt and expand to include an examination of rules, tools, and processes required to provide logistics support within an interagency logistics directorate. *FY 2009 Plans:* US Central Command (CENTCOM) Joint Logistics Transformation -Develop a modified Global Combat Support System-Joint (GCSS-J) that provides the required strategic and operational level logistics information and a USCENTCOM Joint Logistics Common Operational Picture (JLOGCOP) that will enable the joint logistics organization to monitor, evaluate and execute seamless end-to-end logistics support to all activities in the USCENTCOM Theater. Develop a conceptual framework for a theater-wide operational level Joint logistics construct, designed around a Service-based (Army TSC) that will coordinate, integrate and synchronize theater logistics. -Provide planning assistance and subject matter expert (SME) support to MNF-I (DC, R&S) to design an optimal J4 logistics directive (staff section) to support the future merger of the MNF-I and MNC-I into a CJTF-I J4 staff. US Korean Command (KORCOM) Transformation -Support the modification of the current Korea Theater of Operations Joint Logistics construct to accommodate the new supporting to supported relationship between KORCOM and Republic of Korea forces. This will include the development of an enhanced J4 organization and the redistribution of the				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
required Joint Logistics capabilities between it and the current Joint Force Component Support Command (JFSCC) as well as integration into the PACOM Joint Logistics construct. -To more effectively support joint operations, develop the concept of support for KORCOM and identify the required capabilities and enabling rules, tools, and processes to include the requirements for supporting IT development. US Special Operations Command (USSOCOM) Joint Special Operations Warfighting Support Capability (JSOWC) -Develop a single Special Operations C2 Joint Logistics Support Capability with supporting rules, tools and processes that provides synchronization of strategic and operational-level logistics activities at the combatant command and component levels. -Faster identification of theater SOF log requirements and shortfalls. -Improved capability to direct theater and allocate logistics resources and more effectively adjudicate conflicting priorities. US Southern Command Joint Interagency Security Command South (JIASC-S)) -Identify specific Interagency logistics enabling rules, tools, and processes that require integration to enhance SOUTHCOM's larger operational level logistics capabilities. -Develop a Joint & Interagency Logistics Integration Concept of Operations (CONOPS) to provide the broad framework within which Joint and Interagency logistics capabilities will be integrated. Multinational Experimentation (MNE) 6 - Logistics -Conduct experimentation on the beta NATO Logistics Functional Area System (LOGFAS) which will become the logistics system of record to support the International Security Assistance Force (ISAF) in Afghanistan, leading to more efficient logistics and sustainment support to both irregular and conventional military operations via improved logistics information sharing between the partner nations and the combined force commander, and Standardized multinational logistics user guidance and system standards to ensure logistics information system interoperability among multinational partner nations. Seabasing				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Provide DOTMLPF-P recommendations for overcoming or mitigating identified gaps to enable effective Joint Seabasing capabilities by conducting in-depth analysis of all FSA#2 associated gaps, as identified through the Joint Seabasing Analysis and Wargaming (JSAW) Phase II campaign modeling of the approved MCO 2024 scenario *FY 2010 Plans:* Advanced Air Refueling -Assess current and future requirements in order to improved the effectiveness, range and time-on-station of air refueling operations through the assessment and identification of near term technologies and the associated processes, tools and Concept of Operations (CONOPS) required to implement advanced air refueling techniques including process automation and protection against directed energy threats. Autonomous Landing Guidance -Improve joint force projection capability by assessing current capabilities and requirements to conduct humanitarian relief operations on a global scale regardless of weather conditions and navigation aid infrastructure, defining specific capability gaps in terms of expected JFC missions over the near, mid and far term horizons and identifying/generating and validating potential solutions across the range of DOTMLPF-P domains.				
Net Centric Net – Centric: NC LOJX projects will provide the Joint Force Commander a framework for full human and technical connectivity and interoperability that allows all users and mission partners to share the information they need, when they need it, in a form they can understand and act on with confidence, and deny access to our adversaries. *FY 2008 Accomplishments:* Cyber Ops LOJX was established mid-FY 08; JCD&E Enterprise continued Cyber Ops as an FY09 LOJX due to successful experimentation to date and its increasing importance. -Co-authored Information Operations (IO) and Joint Intelligence Preparation of the Environment (JIPOE) White Paper, with USSTRATCOM's JIOWC J2. Additionally, it influenced the revision of JP 2-01.3 (Joint Tactics Techniques and Procedures for Joint Intelligence Preparation of the Battlespace) and JP 3-13	8.209	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
(Information Operations), and provided a framework for the functions and skill sets necessary to support IO within the COCOM Joint Intelligence Operations Centers (JIOCs). Once approved, the white paper will be distributed through DUSD (WS) IO & SS to inform COCOM JIOCs of the higher fidelity intelligence and information needs required to support information operations -Developed scenarios to assist AFRICOM with analysis of its staff structure and processes during its initial operational capability. Specific JIOC enabling themes identified to support USAFRICOM's staff training process were knowledge management and information sharing. -Expanded the concept of Cross Functional Fusion Cells (CFFC) from the tactical echelon and developed concepts and approaches in the writing of a white paper and pamphlet to detail the principles of the tactical level success, and provide the basis/foundation for extending those appropriate and relevant attributes to higher command echelons conducting military and/or civil support operations. The paper and pamphlet examined the underlying principles of Iraq Fusion Cells to determine core attributes and identify under what conditions a CFFC is appropriate and how its function differs from working groups, tiger teams, and other traditional approaches. *FY 2009 Plans:* -No projects are specific to NC. Several projects in the other LOJX sections are secondary, to include: Joint Force Commander Domain Awareness; Cyberspace Operations; Multinational Experiment 6; “Hybrid Threat” Experimentation with Israeli Defense Force; Joint Force Commander Command and Control; Coalition Networks: Multinational Experiment 6 Logistics; Interagency Shared Common Operational Picture; Joint Distributed Operations *FY 2010 Plans:* Space Vulnerabilities -Improve the ability of the JFC to monitor, identify, prevent and react to security threats against space systems and assets through improved sensor capabilities, architectures, command and control systems and information sharing specifically tailored to the space environment, as well as with denied or degraded access to space assets or systems. Distribution Network Analysis				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
-Improve the JFC's capability to conduct offensive and defensive vulnerability analysis of critical infrastructures by developing and analyzing distribution network models of critical infrastructure sectors. -Improve the JFC's capability to protect or target select infrastructure sectors by identifying critical nodes and links. -Improve the JFC's capability to identify and predict cascading effects of induced network faults in a single critical infrastructure sector or in multiple interrelated sectors. Information Collaboration and Integration -Improve the ability of the JFC to prevent or react to conflict or civil strife through increased integration of joint, interagency and multinational force assessment frameworks for determining drivers of conflict and instability.				
Protection (P) Protection: P LOJX projects will provide the Joint Force Commander the ability to prevent/mitigate adverse effects of attacks on personnel (combatant/non-combatant) and physical assets of the United States, allies and friends. *FY 2008 Accomplishments:* New LOJX in FY09. Previously reported under Countering Weapons of Mass Destruction (CWMD) LOJX. *FY 2009 Plans:* Combating Weapons of Mass Destruction – Radiological/Nuclear (CWMD-RN) Detection and Disablement -Improve the Joint Force Commander's ability to detect and characterize radiological and nuclear materials (RN) by proposing a holistic enhanced systems approach employing current and near term detection technologies (sensors), augmented by effective use of non-sensor capabilities (intelligence, info-sharing and fusion, predicative analysis, etc), to enhance the ability to detect, track and identify such materials. -Analyze and experiment with mid-term technological solutions that could be accelerated to fill vital gaps in the current proposed enhanced systems approach to RN detection.	1.108	6.743	6.489	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Combating Weapons of Mass Destruction (Biological (CWMD BIO) -Improve the Joint Force Commander's ability to detect and characterize biological materials by proposing a holistic systems approach, employing current and near term technologies, augmented by effective use of non-sensor capabilities (intelligence, information sharing, predictive analysis, etc.) to improve the ability to detect, locate, characterize (and establish attribution), interdict and eliminate/render safe biological pathogens to prevent their use by irregular adversaries. -Analyze and experiment with mid-term technological and/or organizational solutions identified for acceleration/implementation to fill capability gaps in detection, localization and characterization of sophisticated and/or genetically engineered biological pathogens. Global Integrated Air and Missile Defense (GIAMD) -Analyze current capabilities and gaps regarding GIAMD, including cruise missile, ballistic missile, manned and unmanned air vehicle threats, and identify/refine C2 architectures, processes and information sharing requirements for effective GIAMD and coordination between theater, national, and coalition partners. *FY 2010 Plans:* -Plan for infrastructure Anti-Terrorism Project to improve the ability of the JFC to collaborate and integrate operations with federal, state and local agencies to protect critical homeland infrastructure and maintain essential services when threatened by terrorist networks. The JFC will have enhanced interagency, all domain, all hazard fusion center for suspicious activity reporting, indications and warning, analysis, fusion and broadcast warning dissemination. Ballistic Missile Defense -Conduct experimentation and analysis to improve the JFC's decision and reaction timelines responding to ballistic missile threats, to determine optimal command and control architectures, procedures and technologies, increasing the effectiveness of ballistic missile defense through assessing and identifying precision sensors, weapons and developing processes, tools and CONOPS specifically designed to minimize or eliminate ballistic missile threats.				
Joint Urban Operation (JUOO)/ Irregular Warfare Center (IWC)	6.614	5.038	5.189	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Joint Urban Operations – JUO LOJX projects will provide the Joint Force Commander with the ability to lead, coordinate, and integrate the urban operations doctrine, organization, training, and equipment activities of the DOD Components to improve and transform the capabilities of joint forces in conducting urban operations over the full range of urban contingencies. The IWC leads and directs the integrated USJFCOM approach with DoD, Multinational and Interagency partners for Joint Force Irregular Warfare (IW) concept development, training, integration, doctrine development, and experimentation to ensure Joint Forces IW capabilities meet Combatant Commander campaign and complex contingency requirements. *FY 2008 Accomplishments:* Irregular Warfare Development Series -Commenced evaluation and experimentation in support of SOCOM to address the capability gaps for conducting irregular activities as described in the 2006 Quadrennial Defense Review and the Irregular Warfare Joint Operating Concept. Key areas of exploration include: Interagency and international partner collaboration; rebalancing Special Operations Forces (SOF) and General Purpose Forces (GPF) to provide effective Train, advice and assist support to international partners; countering violent extremism; and understanding the dynamic irregular threat changes and the operational environment. Analytic reports were produced to enhance the Joint Force Commander's understanding of these challenges and to identify potential solutions to them. Joint Urban Operations • Developed, in collaboration with the Israeli Defense Forces, draft white papers focusing on the following Irregular Warfare topics: Campaign planning for irregular warfare (USSOCOM lead); Winning the influence effort-the role of strategic communications (U.S. Army TRADOC lead); Understanding the operational environment-Employing ISR in complex environments against a hybrid threat (U.S. Army TRADOC lead); Maneuvering in complex environments (USMC lead); Joint Fires in irregular warfare (U.S. Army TRADOC lead). • Joint Urban Warrior 2008 (JUW 08). USJFCOM/USMC co-sponsored Wargame explored and framed Joint Capability coalition and IA relationships necessary to transition from conflict to stability and support operations. Participants included 18 partner nations, OSD, DOS, USAID, Army, Marine Corps, Navy,				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Air Force, USSOCOM, JIEDDO COIC, students from the Army and Marine Corps Command and Staff Colleges, and academia. Observations and insights from JUW 08 will be incorporated directly into the training pipeline via Mission Rehearsal Exercises and through distribution of the JUW08 interactive battle book. • Networked Urban Operations Test Bed Spiral 2 Experiment improved non lethal effects and crowd behavior modeling and simulation capabilities. Improved capability will model crowd responses to directed energy weapons through federated crowd and entity-level models, providing a simulated venue to experiment on and assess the reactions of virtual large crowds (500+ individuals). *FY 2009 Plans:* Irregular Warfare Center Joint Urban Operations Science & Technology (IWC JUO S&T) - Urban operations capability gaps associated with sensors, weapons, C2 systems and other equipment shortfalls are mitigated through the identification, assessment, and transition and fielding of appropriate solutions, or through the direct integration of associated requirements into existing Service or agency programs. - Realistic urban testing and experimentation venues and systems are available to enable rapid and effective assessment of emerging urban operations-related concepts, technologies and tactics, techniques and procedures by the Services, agencies and combatant commands. Irregular Warfare Center Joint Urban Operations Quick-Turn Capabilities-Based Assessment (CBA), Irregular Warfare Master Plan, Functional Solutions Analysis (FSA) Integration - CBA: Identification of the Joint Urban Operations (JUO)-unique capability gaps within the JUO Joint Integrating Concept (JIC) 12 required capabilities, and production of Joint Capability Integration & Development System (JCIDS) documentation sufficient to achieve transition to FSA. - Master Plan: Overarching strategy that provides context and direction to JFCOM DOTMLPF-P initiatives related to IW. - FSA Integration: Greater integration and effectiveness, and potentially reduced redundancy, of DoD JCIDS activities that seek to address critical IW and JUO capability shortfalls. Joint Urban Operations Geospatial Analysis Planning Support (GAPS)				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Mission planning toolset that provides the military planner with the ability to rapidly analyze terrain and resulting sensor coverage for multiple, diverse sensor systems in both complex and urban terrain. - Transition GAPS joint integrated capabilities to Service programs of record, and sustain warfighter capability/support Joint Urban Warrior (JUW) 09 - The JFC executing will understand complexities associated with shaping. - The JFC will understand Enhanced Capability Team (ECT) resources that will benefit the joint force during shaping. - The organizations involved in transition will possess the information required to develop a global perception management policy. Small Unit Decision Making Limited Objective Experiment (LOE) - Identify how warfighters make decisions under stress and what is learned during the initial firefights that drastically increase life expectancy, leading to the transfer of results to Service programs of record - the impact of cognitive, physical and moral decision making process and provide empirical data to facilitate the development of realistic combat training environments for live, virtual and constructive (LVC) training/ decision making. *FY 2010 Plans:* -Objectives (due to the dynamic nature of the Urban Operations Environment and Irregular Warfare specific projects and focus areas are subject to fringe changes): - In concert with the Joint Urban Operation and Irregular Warfare community, continued development, articulation and refinement of DOD Joint Urban Operations Roadmap, as a comprehensive document describing DoD's approach to lead, coordinate, and integrate urban operations doctrine, organization, training, and equipment that improve and transform the capabilities of Joint Forces for conducting urban operations. Outcome: DoD Master Plan for Joint Urban Operations - Advancement of S&T integration focuses on specific efforts to eliminate or mitigate shortfalls by identification, assessment, transition and fielding of appropriate solutions or through direct integration of associated requirements into existing Service or agency programs. Outcomes: Improved integration,				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
coordination and synchronization of sensor, command and control and fires capabilities needed for effective operations. Improved testing and experimentation capabilities to assess urban operations concepts, technologies and TTPs. - Leveraging a partnership with the Joint Unmanned Ariel System Center of Excellence (JUAS COE), Assessment of current and planned efforts to employ DoD unmanned aircraft systems (UAS) capabilities for Foreign Internal Defense and Influence Operations, that enhances the overall capability of the DoD in execution of operations in the Urban Environment. Outcomes: UAS FID and Influence Operations Assessments and Execution Strategies - Improve the DoD Test and Evaluation Strategic Plan for the urban environment. Work across the DoD to ensure that we effectively represent the nuanced challenges realized in the Urban Environment across the Test and Evaluation community. Outcomes: Improved replication of the Urban Environment for T&E, that results in better understanding and risk assessment in the system development process. - Continued advancement of warfighting systems that have improved functionality and applicability in the Urban Environment. Leverage ongoing developmental efforts across the DoD and partner nations, to identify and advance capabilities. Outcomes: Assessment of various capabilities for suitability in the Urban Environment. - In partnership with Army TRADOC, AMSAA, JNLWD, VMASC and JFCOM J7, pursue improved M&S capabilities related to the urban environment, including the population, terrain and infrastructure. Outcomes: Military-Crowd interaction case studies focused on regions of interest. Improved crowd and population models that support urban-related training, analysis and experimentation.				
Collaboration Gateway Gateway to allow on-going discussions with all the Combatant Commands, Military Services and Defense Agencies on experimentation needs, priorities and work plans. *FY 2009 Plans:* Gateway to allow on-going discussions with all the combatant commands, military services and defense agencies on experimentation needs, priorities and work plans.	0.000	1.200	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Joint Futures Group	1.100	0.000	1.133	

The Joint Futures Group (JFG) is a unique entity within Joint Forces Command that integrates "future thinking" and provides a "skunk work" like environment within which to generate innovative ideas about future challenges and military implications for JFCOM and the DOD. The JFG is the command's team to identify the next big challenges or opportunities for the joint force that are not being addressed elsewhere in DoD.

The joint force commander requires clarity on the trends, contexts, challenges and opportunities in the complex joint operating environment that are likely to be encountered in the next several decades. Specifically for JFCOM, JFG provides a dedicated group outside the mainstream command effort to search for and identify big challenges or opportunities that are not being addressed elsewhere in DOD. Furthermore, this group should integrate this futures research into other more mainstream evolutionary command processes.
Provides research on the futures environments to Joint Experimentation and the Joint Irregular Warfare Center for concept development and to provide the basis for experiment scenarios.

The mandate of the Joint Futures Group is to provide a vision of the future as it pertains to implications for the joint force by collecting, synthesizing and disseminating the world's strategic and international relations futures efforts. It accomplishes this through the Joint Operating Environment (JOE) project and the by continually enriching the DOD analytical agenda. The JOE effort is the written future problem statement for the Capstone Concept for Joint Operations (CCJO) as directed by the Joint Chief of Staff Chairman and is intended to inform the JOC and Joint Integrating Concepts and functional concepts as well as to provide a framework to experiment with those concepts through its vision of the future. Our support to the analytical agenda consists of improving and refining the Defense Planning Scenarios (DPS) and ensuring that the DPSs reflect a more balanced set of irregular and hybrid warfare challenges.

FY 2008 Accomplishments:
- Produced the Joint Operating Environment (JOE)
- Conducted multinational and international conferences
- Conducted red-teaming to support joint concept development and experimentation scenarios

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
• At NORTHCOM's request provided keynote futures brief, and participated in all of the NORTHCOM Homeland Defense / Civil Support Limited Objective Experiment (LOE). • Published Trend Papers/Articles: To support COCOM and Service concept development, research and publish focused trend papers that identify key trends of the present or future. - "JOE and CCJO Implications for Future Joint Force Readiness" - "Identity based Conflicts over Global networks" - "Iran: Energy and Instability" - "Open Source Warfare" - Articles for Publication: JFQ, Marine Corps Gazette *FY 2009 Plans:* • To support the Chairman's CCJO, complete 2008 JOE and begin development of 2009 Joint Operating Environment White Paper. Produce research papers with emphasis on the future trends, conditions, challenges, and opportunities faced by future joint warfighting. • Monitor, modify, and refine analysis of future trends and context to improve the JOE. • At the request of the COCOMs, Services and Multi National governments provide periodic "future briefs" to combatant commanders, multinational partners, war colleges, concept developers, services, senior contractors, and DoD officials. • Allied Command Transformation Support: (JCS Tasker) As ordered, provide US-perspective "futures support" to NATO's ACT Multiple Futures Project (MFP) and support the development of NATO future related analysis, research and strategic reports. Delivering: - Coordinated the 4th ACT/JFCOM Futures Forum "How Robotics/UAVs change the character of warfare" (30 Oct 09). - Produced Future Country Force Assessments Paper (15 Nov 09) - Participated as the US representative in the Albania Strategic Partnership Conference (Nov 09) - Participated in 6 workshops and led the Training MFP workshop. Incorporated relevant results into USJFCOM Training and Readiness Assessment "White Paper" - ACT Futures Study, assess the Top 50 NATO capabilities in a Bi-Strategic Command (ACT/ACO) effort to determine what NATO nations (including US) need to change to meet the future security environment (Oct 08 - Mar 09).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
• Support the Bi-SC Flag Officer/General Officer prioritization event to ensure these recommendations are incorporated (5 Mar 09). • Develop "worst case" future scenarios and vignettes • Joint Operating Environment Seminars: Expanding the knowledge of Hybrid & Irregular Warfare gained in the Dec. and Feb J5 Irregular Warfare Conferences by planning and executing follow-on international conferences and seminars that explore these threats and the contexts the JFC will face in the future. (Seminars directly support the JIWC and the hybrid and IW concepts and capabilities developed across the Command, SOCOM and DOD). • Provided keynote speech at TRADOC Army Future Environment Conference & USAF A8X Air Force Futures Game. • Support to JFCOM CDR's Joint Warfighting Conference, 12-14 May 09 • Support to Bundeswehr & JIWC by hosting the Major Urban Environments JOE Conf. 27-28 May 09 • Publish White Paper: "Russia's Military Influence in its Near-Abroad" *FY 2010 Plans:* • Conduct research and Update the Joint Operating Environment White Paper for 2010 . The Joint Operating Environment (JOE) provides clarity on possible alternative future operating conditions and the challenges, and the implications of that environment on the Joint Force. • Synthesize and promote a vision of the future that includes critical analysis of future perspectives, battlefield innovation, disruptive technologies, and operational lessons learned. • With other USJFCOM activities, support the development of solutions to close/mitigate those challenges and identify means to exploit future opportunities. • Inform and support development of scenarios to for use in joint wargames and experiments • Specific and measurable outcomes include: - Collect and synthesize dispersed information and insights in the future - Craft a set of alternative futures scenarios to guide focused scenario development for joint exercises and experiments - Integrate USJFCOM activities to inform and influence DOD's future force planning efforts (e.g. the DOD Analytic Agenda)				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- A joint futures narrative that integrates plausible alternative futures, develops military implications of those futures, and guides future operational concepts and requirements. - Host 2-4 conferences per year to concentrate on a subject worthy of deep analysis (e.g. Hybrid Warfare, disruptive technologies such as EMP, urban warfare) - A collaborative web presence that allows for wide participation in the development of research and to communicate the Joint Narrative. - A “feed” to the USJFCOM Joint Experimentation of the next big challenges facing the joint force that warrant concept development and experimentation focus.				
Irregular Warfare (IW)	0.000	0.000	10.000	
The institutionalization of Irregular Warfare (IW) as core competency of the U.S. Armed Forces is of critical importance. In FY10 a Joint Center of Excellence will be developed to ensure IW dominance at the small unit level, particularly against the hybrid threat. This specialized center will enable ground combat simulation and training small unit leader development capabilities to achieve parity with those serving so well in the aviation and maritime communities.				
FY 2010 Plans: The institutionalization of Irregular Warfare (IW) as core competency of the U.S. Armed Forces is of critical importance. In FY10 a Joint Center of Excellence will be developed to ensure IW dominance at the small unit level, particularly against the hybrid threat. This specialized center will enable ground combat simulation and training small unit leader development capabilities to achieve parity with those serving so well in the aviation and maritime communities.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable for this item.

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E. Performance Metrics

Performance of Joint Experimentation efforts is measured by successful development of:
(1) objective validation of enhanced CoCom 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 for joint materiel solutions for implementation by Service and Agency force developers and acquisition authorities,
(4) identification of innovative integrated solutions and joint interoperability standards for Service-developed military capabilities, and
(5) resolution of specific joint capability shortfalls delineated through the Joint Forces Command Combatant Commander Engagement process and through the Concept Joint Capabilities Integration and Development System (JCIDS), specifically in Most Pressing Military Issues (MPMI) and Integrated Priority List (IPL) shortfall compilations.

The JE enterprise benefits from a number of authoritative references outlining processes to develop experiments and validate results. There is no current certification process to confirm the analytical rigor and operational relevance of individual efforts undertaken by USJFCOM under the JCD&E process. In FY09, the Defense experimentation community will initiate discussions on content, context and confirmation of standards to ensure outcomes are meaningful and actionable with confidence.

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COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	22.068	33.602	38.505						Continuing	Continuing
P476: DoD Modeling and Simulation Management Office	22.068	33.602	38.505						Continuing	Continuing

A. Mission Description and Budget Item Justification

Modeling and Simulation (M&S) is a key enabler of DoD activities in communities such as acquisition, analysis, experimentation, planning, test & evaluation, and training. The strategic objective of the DoD Modeling and Simulation Management Office is to execute enterprise management of a robust, defense-wide M&S capability. The goal is to enhance the return on DoD's M&S investment through funding and coordinating high-priority activities that: (1) encourage collaboration among M&S stakeholders throughout the DoD; (2) promote outreach and better understanding of defense systems, missions, and operations; (3) support efficiency, reduce duplication, and enhance reuse through improved characterization of M&S programs and resources; and (4) leverage the investment in this National Critical Technology within the DoD, with other governmental agencies, industry, and academia. Under the authority of DoD Directive 5134.1, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) provides the oversight for this Modeling and Simulation Management Office Program Element with advice and assistance from a flag-officer level M&S Steering Committee. The Program Element is executed by the Modeling and Simulation Coordination Office (M&S CO) in accordance with DoD Directive 5000.59, Management of Modeling and Simulation, 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.

Comment: Performance in this program is monitored in the following ways:
1. Number of instances where M&S standards have been adopted.
2. Number of M&S standards registered with the Defense Standardization Program.
3. Number of M&S capabilities identified in Community M&S business plans and in the Corporate and Crosscutting Business Plan.
4. Number of new M&S gaps addressed in Community M&S business plans and in the Corporate and Crosscutting Business Plan.
5. Number of policy decisions obtaining M&S Steering Committee concurrence, which result in action with the Communities and Services.
6. Number of M&S resources (tools, data, and services) made visible for reuse.
7. Number of curricula available for educating the M&S workforce.
8. Number of collaborative events held with other DoD Departments and Agencies and with coalition partners.

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603832D8Z DoD Modeling and Simulation Management Office

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	22.639	38.147	39.208	
Current BES/President's Budget	22.068	33.602	38.505	
Total Adjustments	-0.571	-4.545	-0.703	
Congressional Program Reductions		-5.000		
Congressional Rescissions		-0.185		
Total Congressional Increases		0.640		
Total Reprogrammings				
SBIR/STTR Transfer	-0.526			
Internal realignment of funds	-0.045			
Other			-0.703	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: P476, **Modeling and Simulation Standards Development**		0.640

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603832D8Z DoD Modeling and Simulation Management Office					**PROJECT NUMBER** P476	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P476: DoD Modeling and Simulation Management Office	22.068	33.602	38.505						Continuing	Continuing

A. Mission Description and Budget Item Justification

Modeling and Simulation (M&S) is a key enabler of DoD activities in communities such as acquisition, analysis, experimentation, planning, test & evaluation, and training. The strategic objective of the DoD Modeling and Simulation Management Office is to execute enterprise management of a robust, defense-wide M&S capability. The goal is to enhance the return on DoD's M&S investment through funding and coordinating high-priority activities that: (1) encourage collaboration among M&S stakeholders throughout the DoD; (2) promote outreach and better understanding of defense systems, missions, and operations; (3) support efficiency, reduce duplication, and enhance reuse through improved characterization of M&S programs and resources; and (4) leverage the investment in this National Critical Technology within the DoD, with other governmental agencies, industry, and academia. Under the authority of DoD Directive 5134.1, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) provides the oversight for this Modeling and Simulation Management Office Program Element with advice and assistance from a flag-officer level M&S Steering Committee. The Program Element is executed by the Modeling and Simulation Coordination Office (M&S CO) in accordance with DoD Directive 5000.59, Management of Modeling and Simulation, 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.

The M&S CO is responsible for facilitating and coordinating:
(1) execution of DoD's Strategic vision for DoD Modeling and Simulation activities
(2) oversight and strategic governance of DoD's M&S capabilities and resources
(3) development and implementation of policies, plans, procedures, and DoD issuances to manage M&S, to include the M&S Corporate and Crosscutting Business Plan and the community business plans
(4) best practices for M&S acquisition, development, management, and use by DoD Components and communities
(5) development of M&S technologies to meet identified capability gaps

The M&S CO also serves as DoD's:
(1) lead standardization activity (LSA) for managing modeling and simulation standards and methodologies
(2) focal point for coordinating DoD M&S outreach activities and interactions with non-DoD M&S agencies including NATO and Partnership for Peace (PfP) nations, The Technical Cooperation Program (TTCP), and other international Allies.

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The Modeling and Simulation Coordination Office (M&S CO) objectives for community best business practices include:
Commonality: making visible and accessible common and crosscutting M&S tools, data, and services.
Reuse: fostering visibility, accessibility, and usability of such components.
Interoperability: creating and maintaining standards that enhance interoperability among the real operations environment, the simulated operations environment, and the range operations environment.
Efficiencies: coordinating enterprise-wide M&S activities for cost efficiency in satisfying departmental strategic requirements including, but not limited to, standards for the use of M&S; DoD M&S Coordination Agents; a DoD M&S Information Analysis Center; and M&S professional development.
Effectiveness: enabling enhanced effectiveness and use of M&S through rapid sharing of readily understandable verification, validation, and accreditation information.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
DoD Modeling and Simulation Management Office	22.068	33.602	38.505	

FY 2008 Accomplishments:
The DoD initiated a new M&S management structure and implemented its M&S strategic vision and goals as the foundation for selecting M&S priorities and subsequently allocating resources supporting the Department-level goal to “use all sources of information – combat experience, intelligence, commercial marketplace, and our technology – to inform our choices and to minimize the probability of technology surprise from adversaries.” M&S best business practices provided the necessary capabilities that allow the Warfighter to defeat any adversary on any battlefield. In FY 2008, the DoD Modeling and Simulation Management Office program element accomplished the following: Completed the development of an initial draft of the M&S Corporate and Crosscutting Business Plan and continued the evolution of the Community Business Plans, identifying major capabilities which limit the DoD's effective use of M&S. Continued acting as the USD(AT&L) action agent in developing M&S policies, plans and programs that support the effective and efficient management of the Department's M&S resources. Continued a two-year effort to provide authoritative natural environment representations (initially focused on space and weather) to the DoD M&S community for use in distributed simulation-based activities. Continued a two-year effort to develop recommended changes to policy and guidance for the verification, validation, and accreditation (VV&A) of models and simulations while standardizing VV&A planning and reporting. Addressed Political, Military, Economic, Social, Infrastructure, and Information non-kinetic effects of warfare: consolidated the basic research, continued improving existing models and simulations to

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
reflect these effects, and initiated an effort to develop a DoD-owned simulation to represent these effects. Improved the capabilities of existing simulations to address homeland defense challenges. Continued to improve the ability to rapidly generate and analyze multi-option operational plans. Continued research necessary to educate the DoD workforce to more effectively employ M&S. Acted as lead standardization activity (LSA) for managing M&S standards and methodologies. Served as focal point for coordinating DoD M&S outreach activities and interactions with non-DoD M&S agencies including NATO and Partnership for Peace (PfP) nations, The Technical Cooperation Program (TTCP), and other international Allies. *FY 2009 Plans:* DoD M&S management is implementing the "Strategic Vision for DoD Modeling and Simulation" and its emerging focus areas of standards, interoperability, and visibility. The goal is to achieve a set of standards for the development, integration, and conduct of DoD M&S activities; improved interoperability driving the Department towards best business practices across the spectrum of DoD activities; and increased capability to discover and reuse modeling and simulation (tools, data, and services) across the Department. Specific high-level tasks planned for FY09-11 include coordinating the development and dissemination of tools for the Department's chief priority – irregular warfare; managing the DoD #1 M&S priority – standards; developing distributed simulation architectures; evolving towards a net-centric architecture; implementing new Verification, Validation and Accreditation (VV&A) technologies and processes; continuing as lead standardization activity (LSA) for managing M&S standards and methodologies; and serving as focal point for coordinating DoD M&S outreach activities and interactions with non-DoD M&S agencies including NATO and Partnership for Peace (PfP) nations, The Technical Cooperation Program (TTCP), and other international Allies. These tasks will develop, produce, and apply enterprise-wide best business practices which will encourage commonality, interoperability, reuse, and cost savings across the Services, Combatant Commands, and OSD-level activities. These efforts are essential to informing choices for Joint solutions and providing for improved enterprise efficiency, effectiveness, and return on investment (ROI) for M&S.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: DoD M&S management is implementing the "Strategic Vision for DoD Modeling and Simulation" and its emerging focus areas of standards, interoperability, and visibility. The goal is to achieve a set of standards for the development, integration, and conduct of DoD M&S activities; improved interoperability driving the Department towards best business practices across the spectrum of DoD activities; and increased capability to discover and reuse modeling and simulation (tools, data, and services) across the Department. Specific high-level tasks planned for FY09-11 include coordinating the development and dissemination of tools for the Department's chief priority – irregular warfare; managing the DoD #1 M&S priority – standards; developing distributed simulation architectures; evolving towards a net-centric architecture; implementing new Verification, Validation and Accreditation (VV&A) technologies and processes; continuing as lead standardization activity (LSA) for managing M&S standards and methodologies; and serving as focal point for coordinating DoD M&S outreach activities and interactions with non-DoD M&S agencies including NATO and Partnership for Peace (PfP) nations, The Technical Cooperation Program (TTCP), and other international Allies. These tasks will develop, produce, and apply enterprise-wide best business practices which will encourage commonality, interoperability, reuse, and cost savings across the Services, Combatant Commands, and OSD-level activities. These efforts are essential to informing choices for Joint solutions and providing for improved enterprise efficiency, effectiveness, and return on investment (ROI) for M&S.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

(U) Comment: Performance in this program is monitored in the following ways:
(U) 1. Number of instances where M&S standards have been adopted.
(U) 2. Number of M&S standards registered with the Defense Standardization Program.
(U) 3. Number of M&S capabilities identified in Community M&S business plans and in the

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Corporate and Crosscutting Business Plan.
(U) 4. Number of new M&S gaps addressed in Community M&S business plans and in the
Corporate and Crosscutting Business Plan.
(U) 5. Number of policy decisions obtaining M&S Steering Committee concurrence, which result in action with the Communities and Services.
(U) 6. Number of M&S resources (tools, data, and services) made visible for reuse.
(U) 7. Number of curricula available for educating the M&S workforce.
(U) 8. Number of collaborative events held with other DoD Departments and Agencies and with coalition partners.

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603941D8Z Test and Evaluation/Science and Technology

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	61.224	94.153	95.734						Continuing	Continuing
1: High Speed / Hypersonic Test	15.681	17.363	18.906						Continuing	Continuing
2: Spectrum Efficient Technology	1.177	6.349	6.210						Continuing	Continuing
3: Multi-Spectral Test	9.357	14.239	16.505						Continuing	Continuing
4: Non-Intrusive Instrumentation	7.451	6.519	4.846						Continuing	Continuing
5: Directed Energy Test	14.753	16.964	20.419						Continuing	Continuing
6: Netcentric Systems Test	8.807	12.254	12.477						Continuing	Continuing
7: Unmanned and Autonomous System Test	3.998	5.465	6.371						Continuing	Continuing
8: Common Range Integrated Instrumentation System	0.000	15.000	10.000						Continuing	Continuing
9: Multi-Level Security	0.000	0.000	0.000						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 pace evolving weapons technology. The program is critical to ensuring that the Department of Defense (DoD) has the capability to adequately test the advanced systems that will be fielded in the future. To meet this objective, the T&E/S&T program:

- 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 commercial equipment, modeling and simulation, and networking innovations to support T&E.

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Additionally, the T&E/S&T program examines emerging T&E requirements derived from joint service initiatives to identify needed technology areas and develop a long-range roadmap for technology insertion. The program leverages and employs applicable 6.2 applied researches from the highly developed technology base in the DoD laboratories and test centers, other government agencies, industry, and academia to accelerate the development of new test capabilities. This PE also 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 is funded within the Advanced Technology Development Budget Activity because it develops and demonstrates high payoff technologies for current and future DoD test capabilities.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	62.344	94.672	96.358	
Current BES/President's Budget	61.224	94.153	95.734	
Total Adjustments	-1.120	-0.519	-0.624	
Congressional Program Reductions		-0.519		
Congressional Rescissions				
Total Congressional Increases				
Total Reprogrammings				
SBIR/STTR Transfer	-1.120			
Inflation Adjustments			-0.624	

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APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)				**R-1 ITEM NOMENCLATURE** PE 0603941D8Z Test and Evaluation/Science and Technology					**PROJECT NUMBER** 1	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
1: High Speed / Hypersonic Test	15.681	17.363	18.906						Continuing	Continuing

A. Mission Description and Budget Item Justification

DoD is developing air-breathing weapons, advanced aircraft and access to space platforms to operate in the high speed (Mach 3-5) and hypersonic speed (Mach 5 and above) regimes. High speed/hypersonic systems to be developed by DoD will require T&E capabilities in numerous areas ranging from ground testing [e.g. wind tunnels, sled tracks, installed-system test facilities, and modeling and simulation (including computational fluid dynamics)] to flight testing. At high and hypersonic speeds, flight testing will challenge existing ground instrumentation systems (e.g., tracking system slew rate limitations, telemetry dropouts due to ionization, etc.) and range safety decision making. High speed/hypersonic weapon systems will depend on several new technological thrusts in areas such as propulsion and engines, structures and materials, guidance and control, seekers and sensors, warheads and payloads, and weapons delivery techniques and end-game dynamics each of which requires supporting T&E capabilities to determine performance, effectiveness, suitability, survivability, and responsiveness to Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance systems. Service improvement and modernization programs are addressing some basic test facility upgrades using off-the-shelf technologies; however, T&E of high speed/hypersonic systems will require technologies as yet undeveloped or unavailable for T&E purposes. DoD must have adequate T&E capabilities in place in time to meet current development and, ultimately, acquisition program schedules. The purpose of the T&E/S&T High Speed/Hypersonic Test focus area is to address these T&E technology issues.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
High Speed/Hypersonic Test	15.681	17.363	18.906	
FY 2008 Accomplishments: - Continued efforts initiated in prior years. - Completed Pulsed Electron Beam Spectroscopy project to develop and demonstrate non-intrusive sensor technology for temperature and gas concentration measurements in the flow field of hypersonic ground test facilities. - Completed Test Media Effects project, incorporating the effects of vitiates into computational fluid dynamics codes to predict flame holding within hypersonic vehicle combustors used in hypersonic combustion engine tests.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
The effort advances the state-of-the-art in ground test instrumentation for characterization of test environments, and enables characterization of the hypersonic vehicle performance in a wind tunnel using vitiated air and prediction of vehicle flight performance. - Continued Arc Heater Aerothermal project to improve aerothermal test capabilities for ground test of ballistic reentry vehicles. - Continued Clean Air Heater Test Technology project to design and fabricate a high-pressure, elevated temperature air flow system. Continued Combustion Gas Analysis project to fabricate and ground test a non-intrusive laser spectroscopy diagnostic sensor suitable for in-flight T&E of hypersonic propulsion systems. - Continued High Pressure Arc Heater project to extend the operating regime for arc heater facilities to Mach 8-12 regimes. Efforts will provide true air operating conditions to support testing of thermal protection systems and hypersonic combustion systems. - Continued Hypersonic Engine-Facility Interaction project to resolve ground test issues related to vitiate effects at various test facilities using different combustion heater fuels. Efforts will provide an empirical understanding of the effects of vitiated air on hypersonic scramjet engines and support analysis of ground test performance at test facilities. - Continued Micro Fiber Optical Sensor project to develop advanced instrumentation for hypersonic flight test of hot structures; this effort will utilize micro heat transfer sensors for leading edges and pressure sensors for laminar-turbulent transition detection. - Continued Microelectromechanical System (MEMS) Shear Stress Sensor project, demonstrating sensing of bulk shear level and paving the way for flight demonstration. - Continued Modeling and Simulation (M&S) for Hypersonic T&E project to improve mode transition modeling, including capabilities to conduct numerical simulation of time-independent mode transition and simulation of ram to scram mode transition. - Continued Regenerative Storage Heater project to provide a technique to produce non-vitiated air for ground test of hypersonic propulsion systems in a true flight environment; efforts will center on finalizing pilot heater system design. - Continued Variable Mach Number Nozzle project to develop a high Mach number capability, including variable Mach numbers, for propulsion ground test.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continued Variable Mach Number Test Capability project to develop variable Mach 5-7 test capability using energy addition downstream of the plenum. Initiated and conducted new research efforts to address T&E technology challenges in this focus area. - Hypersonic Impulse Facility Analysis project to compare hypersonic propulsion data generated by impulse and short-duration facilities at Mach 5 and Mach 8 and to analyze related runtime and vitiation affects. - Magnetohydrodynamics Augmentation project to vary wind tunnel Mach number. - Parameter Identification Maneuvers project to enable more efficient and productive flight testing. Initiated Broad Agency Announcement (BAA) in FY 2008 to select efforts for FY 2009 award. *FY 2009 Plans:* Continue efforts initiated in prior years. - Complete Arc Heater Aerothermal project to improve aerothermal test capabilities for ground test of ballistic reentry vehicles. - Complete Combustion Gas Analysis project to fabricate and ground-test a non-intrusive laser spectroscopy diagnostic sensor suitable for in-flight T&E of hypersonic propulsion systems. - Complete High Pressure Arc Heater project to extend the operating regime for arc heater facilities to Mach 8-12 regimes. Efforts will provide true air operating conditions to support test of thermal protection and hypersonic combustion systems. - Complete MEMS Shear Stress Sensor project, finalizing fabrication of flight weight system. - Complete M&S for Hypersonic T&E project to develop enhanced M&S tools in support of integrated test article and facility effects modeling; these tools will enable detailed analysis of hypersonic system test prior to physical test in order to reduce risk and cost associated with ground test events. - Complete Micro Fiber Optical Sensor project to develop advanced instrumentation for hypersonic flight test of hot structures; this technology will utilize micro heat transfer sensors for leading edges and pressure sensors for laminar-turbulent transition detection. - Complete Variable Mach Number Nozzle project for propulsion ground test. - Complete Variable Mach Number Test Capability project, developing variable Mach 5-7 test capability using energy addition downstream of the plenum.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Clean Air Heater project, developing a sub-scale resistive element clean air heater system. This technology will support development of a full-scale wind-tunnel heater system capable of providing continuous clean air flow for use in hypersonic aeropropulsion tests. - Continue Hypersonic Engine-Facility Interaction project to enable comparison between research and operational engines and between test facilities, and to predict the influence of vitiate species on overall system performance. - Continue Hypersonic Impulse Facility Analysis project to compare the hypersonic propulsion data generated by impulse and short-duration facilities at Mach 5 and Mach 8, and to analyze related runtime and vitiation affects. - Continue Magnetohydrodynamics Augmentation project to vary wind tunnel Mach number. - Continue Parameter Identification Maneuvers project to enable more efficient and productive flight testing. - Continue Regenerative Storage Heater project, developing a brick storage heater based on novel cored brick materials. Initiate new research efforts to address T&E technology challenges in this focus area. - Advanced Nozzle Throat Designs project to identify high temperature alloys and determine properties for high enthalpy nozzles. - Autonomous Flight Termination and Decision System project to develop this technology for hypersonic test vehicle application. - Clean Air Supply System project to design necessary components for future hypersonic propulsion facilities. - Hypersonic Test Fuel system project to develop a modular hypersonic fuel conditioning system for hypersonic test needs. - Hypersonic Nozzle Cooling project to design tools to extend Mach range and facility nozzle life. - In-Flight Thrust Measurement project to enable wavelength multiplexed, tunable diode laser spectroscopy measurement of scramjet thrust using velocity, density, and combustion species. - Mid-Pressure Arc Heater project to develop core enabling technologies for high enthalpy, long duration arc heater test.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Demonstrate and verify M&S and advanced flow diagnostics technologies developed by HSHT during the Revolutionary Approach to Time Critical Long Range Strike program Missile-in-a-Tunnel test at the NASA Glenn 10x10 supersonic wind tunnel. Initiate BAA in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Continue efforts initiated in prior fiscal years. - Complete Hypersonic Nozzle Cooling project to design tools to extend Mach range and life of facility nozzles. - Complete development and analysis of power-efficient and spectrally-efficient CPM-OFDMA effort, refining the system model based upon performance simulation. - Complete dynamic spectrum access effort, integrating the QoS management scheme into a hybrid network software and conducting laboratory tests, field tests, and demonstrations. - Complete high-rate, high-speed FEC architectures for aeronautical telemetry effort, developing hardware to coherently and non-coherently demodulate/decode FEC waveforms. - Complete low-cost OFDM transceiver effort, integrating the 10W power amplifier module and the low-power AOFDM transceiver and testing the integrated unit. - Complete TCP/IP for aeronautical networks effort, porting and demonstrating the congestion control implementation. - Continue aeronautical network transport protocols effort, simulating and analyzing the protocol suite. - Continue dynamic software commutation/decommutation effort, implementing the software in an embedded system suitable for integration within a test article. - Continue iNET management and operations with policy controls effort, incorporating an enhanced set of policies for QoS, spectrum, network formation, security, and routing into the distributed policy-based network management system design. - Continue spectrum management system with channel modeling and improved coding techniques effort, building a system prototype and conducting an initial field test. Initiate BAA in FY 2010 to select efforts for FY 2011 award.				

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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
2: Spectrum Efficient Technology	1.177	6.349	6.210						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Spectrum Efficient Technology (SET) focus area enables T&E of technologies for more efficient use of legacy telemetry bands and expansion into non-traditional areas of the radio frequency spectrum and the optical spectrum. The Test Resource Management Center realigned SET to perform risk reduction and advanced technology development for the Central Test and Evaluation Program (CTEIP) integrated Network Enhanced Telemetry (iNET) project. iNET is developing an architectural concept for a telemetry network system to address the needs of the T&E and training communities. However, as the iNET architecture was insufficiently defined in time to guide selection and funding of realigned SET projects, the focus area funded no new projects in FY 2008; SET has resumed the standard selection and funding process for execution of new projects in FY 2009.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Spectrum Efficient Technology	1.177	6.349	6.210	
FY 2008 Accomplishments: Continued efforts initiated in prior fiscal years. - Completed Broadband Telemetry Antenna project, including fabrication, integration, testing, and delivery of antennas 1 and 2. - Completed Aeronautical Network Telemetry project, coordinating layer-2 & layer-3 Quality of Service (QoS) approach, confirming transport layer interoperability, and concluding final architecture refinement. - Completed Medium Access Control project, finalizing high fidelity simulations. - Completed Improved Linear Power Amplifier project, reducing linear transmitter power supply, heat sink requirements, weight, size, and cost by 30 percent. - Completed Beamformer Antenna project with successful flight test of prototype antenna. - Continued Enhanced Forward Error Correction (EFEC) project, designing coherent and non-coherent decoders, and measuring coding gain and acquisition time through simulation to identify optimal EFEC code/decoder combinations. - Continued Space-Time Code project to develop a verified space-time code data encoding and processing technique and a prototype receiver designed to improve link reliability.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continued Spectrally Efficient, High Data Rate Telemetry project, to port and modify the Jet Propulsion Laboratory (JPL) Advanced Orthogonal Frequency Division Multiplexing (AOFDM) baseband processing firmware to carry out packet-based communications on an embedded PC/104 platform, and deliver a prototype transmitter/receiver pair. - Ended and closed out Radio Frequency (RF) MEMS Antenna project. - Ended and closed out Phased Array Antenna project. Initiated BAA in FY 2008 to select efforts for FY 2009 award. *FY 2009 Plans:* Continue efforts initiated in prior fiscal years. - Complete EFEC project, finalizing coherent and non-coherent decoders and delivering detailed design of decoders with a performance table identifying the optimal EFEC code/decoder combinations. - Complete Space-Time Code project, delivering a verified space-time code data encoding and processing technique and a prototype receiver designed to improve link reliability. - Complete Spectrally Efficient, High Data Rate Telemetry project, porting and modifying the JPL AOFDM baseband processing firmware to carry out packet-based communications on an embedded PC/104 platform, and deliver a prototype transmitter/receiver pair to Wallops Flight Facility. Initiate new research efforts to address T&E technology challenges in this focus area. - Aeronautical network transport protocols effort to build aeronautical transport, network, and routing protocols for the iNET Communication Link Standards and to verify the protocols through simulations and a fielded prototype. Efforts will include architectural design of the protocol suite. - Development and analysis of power-efficient and spectrally-efficient continuous-phase modulation orthogonal frequency division multiple access (CPM-OFDMA) effort to map a CPM waveform into an OFDM waveform in order to create a waveform that tolerates non-linear amplification during transmission such that a receiver can robustly receive the compressed waveform. Efforts include initial modulator/ demodulator system modeling, determination of system parameters, performance testing through simulation, and analysis of test results to determine key waveform advantages. - Dynamic software commutation/decommutation effort to optimize network performance by making real-time changes to test article telemetry content selection and sample rate and to demonstrate the optimization method in the field with a prototype network. Efforts will include development of				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
an optimized, software-based system that supports real-time changes to content and sample rate parameters. - Dynamic spectrum access effort to develop a network QoS management scheme using explicit control of both frequency and digital access slot assignments. - High-rate, high-speed forward error correction (FEC) architectures for aeronautical telemetry effort to apply FEC in telemetry by developing hardware to demodulate/decode FEC waveforms. - iNET management and operations with policy controls effort to develop a distributed policy-based network management system. - Low-cost OFDM transceiver effort to demonstrate the Tier 3 waveform by porting innovative AOFDM modulator and demodulator firmware to a flight-rated transceiver with a tunable RF transmit/receive module. - Multipath modeling and mitigation using multiple antennas to construct empirically validated multipath channel models for flight line and helicopter pad environments and to develop multipath mitigation techniques by using the multipath channel models. - Spectrum management system with channel modeling and improved coding techniques to develop a method of dynamically sharing spectrum across concurrent test activities by assessing instantaneous demand for network resources. - TCP/IP for aeronautical networks effort to develop a performance-enhancing-proxy (PEP) for the wired/ wireless interface that maximizes data throughput by minimizing the latency of individual packets. Efforts will include PEP development, congestion control implementation, and simulation. Initiate BAA in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Continue efforts initiated in prior fiscal years. - Complete development and analysis of power-efficient and spectrally-efficient CPM-OFDMA effort, refining the system model based upon performance simulation. - Complete dynamic spectrum access effort, integrating the QoS management scheme into a hybrid network software and conducting laboratory tests, field tests, and demonstrations. - Complete high-rate, high-speed FEC architectures for aeronautical telemetry effort, developing hardware to coherently and non-coherently demodulate/decode FEC waveforms.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Complete low-cost OFDM transceiver effort, integrating the 10W power amplifier module and the low-power AOFDM transceiver and testing the integrated unit. - Complete TCP/IP for aeronautical networks effort, porting and demonstrating the congestion control implementation. - Continue aeronautical network transport protocols effort, simulating and analyzing the protocol suite. - Continue dynamic software commutation/decommutation effort, implementing the software in an embedded system suitable for integration within a test article. - Continue iNET management and operations with policy controls effort, incorporating an enhanced set of policies for QoS, spectrum, network formation, security, and routing into the distributed policy-based network management system design. - Continue spectrum management system with channel modeling and improved coding techniques effort, building a system prototype and conducting an initial field test. Initiate BAA in FY 2010 to select efforts for FY 2011 award.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	PE 0603941D8Z Test and Evaluation/Science and Technology	3

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
3: Multi-Spectral Test	9.357	14.239	16.505						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Multi-Spectral Test (MST) focus area develops technologies to test multi-spectral and hyperspectral sensors, seekers, and detectors for weapon systems and intelligence, surveillance, and reconnaissance systems. T&E of new MS and HS sensors to be used in these future weapon systems will require new T&E technologies. Current methods for testing MS and HS sensors rely heavily on expensive field test programs. While these field tests provide realistic data for sensor testing, they leave several critical gaps. For example, test conditions are not repeatable because environments observed one day will be different the next. Imagery can be collected and stored to partially mitigate this deficiency, but the process is expensive and cannot cover the full spectrum of environments required for complete test article evaluation and performance analysis. The T&E community needs the ability to test these advanced seekers and sensors in a repeatable, objective fashion before and after they are integrated into warfighting systems. Without these new T&E technologies, DoD will be unable to perform adequate test and evaluation of the MS and HS weapon systems of the future.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Multi-Spectral Test	9.357	14.239	16.505	
FY 2008 Accomplishments: Continued efforts initiated in prior fiscal years. - Continued MicroPlamsa Emitter project, generating a new method of supplying large voltages to a plasma display, completing Phase I, and beginning Phase II. - Continued multi-spectral and hyperspectral Polarized Scene Projector project, including assembly, characterization, and demonstration of the achromatic phase spatial light modulators; development of software for a brassboard projector; and design, assembly, and characterization of projection optics engine. - Continued Multi-Spectral Passive long-wave infrared Polarization Signature Model project to develop a dynamic, visible/short-wave infrared (VIS/SWIR) and polarization-capable MS scene and signature prediction model for realistic testing of emerging sensors, seekers, algorithms, and signature management treatments. Additional efforts included finalization of software requirements, characterization of Bidirectional Reflectance Distribution Function (BRDF), and approach definition for integration.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continued Next Generation Read-in Integrated Circuits for IR Scene Projection project, testing the NOVA-013 chip and drive electronics and designing the NOVA-014 (512x512) chip. - Continued Sub-Array Light Emitting Diode project, including full-scale fabrication of the ultraviolet array integrated with reflective optics. - Continued Super-lattice Light-Emitting Diode (SLED) project. Successfully tested the design developed for Mid-Wave Infrared (MWIR) SLED and continued fabrication of a Long-Wave Infrared (LWIR) array for testing. Initiated new research efforts to address T&E technology challenges in this focus area. - Cell-based Hyperspectral Atmospheric Radiation Model project to develop a flexible processing architecture to exploit the power of high performance computers and graphics processing unit. - Hyperspectral Imaging Projector project to develop a high output, broadband, MWIR source to control, measure, and correct stray light in the projector and in the reference instrument used to characterize the projected scenes. - Hyperspectral Test Suite project to incorporate seamless, continuous and synchronized MWIR coverage into the existing Hyperspectral Testbed. - Very Near Infrared (NIR)/SWIR and Passive LWIR Polarization Signature Model project to model a 5km x 5km area containing at least 20 vehicles and detailed vegetation and terrain features in the VIS, NIR, and SWIR spectra. - Initiated fiber-optic infrared countermeasures (IRCM) test and evaluation technology designing integration optics for testing infrared countermeasures and missile warning systems. *FY 2009 Plans:* Continue efforts initiated in prior fiscal years. - Complete Sub-Array Light Emitting Diode project with final demonstration. - Continue Cell-based Hyperspectral Atmospheric Radiation Model project and Multi-Spectral Passive long-wave infrared Polarization Signature Model project. Developers will work collaborate to use a breadboard of the former as front end for brassboard testing of the latter. - Continue Hyperspectral Imaging Projector project, developing, designing, and characterizing fibers and an amplified spontaneous emission source.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Hyperspectral Test Suite project, fabricating major subsystems including diffuser and mask, Offner spectrograph, collimator, and characterization unit. - Continue Micro-Plasma Emitter project, implementing new design plan based on program management review/decision. - Continue Multi-Spectral and Hyperspectral Polarized Scene Projector project, generating software for integration and demonstration of a brassboard projector. - Continue Next Generation Read-in Integrated Circuits for IR Scene Projection project, fabricating 512x512 arrays for both photonic crystals and light emitting diodes, and evaluating options for a 1k x 1k array chip carrier. - Continue Superlattice Light Emitting Diodes project, testing and delivering a 512x512 MWIR/LWIR SLED array, the delivering scalability design for arrays 1024x1024 or larger, and submitting the final report. - Continue Initiated fiber-optic infrared countermeasures (IRCM) test and evaluation technology (FITT) designing integration optics for testing infrared countermeasures and missile warning systems. Initiate new research efforts to address T&E technology challenges in this focus area. - Missile Airframe Simulation Testbed project to create a Surface-to-Air Missile surrogate and a vehicle to carry instrumentation for observation of ground systems. - The Multi-wavelength Infrared Simulation Laser project and the Advanced Quantum Cascade Laser Infrared Simulator project are competing efforts to generate a continuous quantum laser with enough power to stimulate a missile warning system at a distance. - Sky Imaging Mapping System project to generate true sky lighting, which affects targeting and scene generation. *FY 2010 Plans:* Continue efforts initiated in prior fiscal years. - Complete Micro-Plasma Emitter project to provide the capability to accurately represent high temperature and flexible spectral emitters for representation of threat weapon signatures in hardware-in-the-loop T&E. - Complete Multi-Spectral and Hyperspectral Polarized Scene Projector project to enable precise control of parameters required to test and evaluate polarized sensors.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Complete Multi-Spectral Passive long-wave infrared Polarization Signature Model project to provide capability for a high spatial/spectral resolution, radiometric, predictive VIS/SWIR background model. This technology will incorporate validated threat signatures for sensor/seeker T&E. - Complete Next Generation Read-in Integrated Circuits for IR Scene Projection project with a 1k x 1k array design. - Continue Hyperspectral Imaging Projector project with prototype assembly and testing. - Continue Hyperspectral Test Suite project with subsystems testing and prototype integration and assembly. - Continue Missile Airframe Simulation Testbed project to create a Surface-to-Air Missile surrogate and a vehicle to carry instrumentation for observation of ground systems. - Continue Multi-Wavelength Infrared Simulation Laser project and the Advanced Quantum Cascade Laser Infrared Simulator project (competing efforts) to generate a continuous quantum laser with enough power to stimulate a missile warning system at a distance. - Continue Sky Imaging Mapping System project to generate true sky lighting, which affects targeting and scene generation. - Continue FITT project, designing integration optics for infrared countermeasures and missile warning systems, developing a 64x64 fiber array, and developing the fiber array coating. Initiate new research efforts to address T&E technology challenges in this focus area. - Hyperspectral NIR/SWIR projector effort to complete the entire spectrum of interest from NIR to LWIR when combined with the Hyperspectral Testbed and Hyperspectral Test Suite projects. - Improvised explosive device signature T&E effort to develop a suite of tests designed for systems that detect improvised explosive devices. - Multi-Spectral/Hyperspectral data fusion T&E effort to enable the combination of all scene generation techniques, including all bandwidths from NIR to LWIR, into one highly detailed, information rich battle scene. - Multi-Spectral/Hyperspectral field characterization system effort for further characterization and classification of realistic battle scene imagery. - Multi-Spectral/Hyperspectral ground targets effort to allow MST to generate ground targets and to alleviate the use of software license costs and associated issues when dealing with third party target generation databases.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Initiate a BAA in FY 2010 to select efforts for FY 2011 award.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
4: Non-Intrusive Instrumentation	7.451	6.519	4.846						Continuing	Continuing

A. Mission Description and Budget Item Justification

Instrumentation requirements for systems-under-test, hardware-in-the-loop testing, and training are increasing exponentially for new weapon systems. Onboard or personnel-borne instrumentation and equipment are required for sensing and collecting critical performance data; determining accurate time, space, position, and attitude information; interfacing with command and control data links; monitoring and reporting system-wide communications; reporting human operator performance; and storing and transmitting data. These requirements drive the need for enabling technologies for miniaturized, non-intrusive instrumentation suites with increased survivability in harsh environments, which the T&E/S&T Non-Intrusive Instrumentation (NII) focus area addresses. Minimal space is available for adding instrumentation to new weapon systems subsequent to their development; moreover, additional weight and power draw can adversely affect weapon system signature and performance. Instrumentation for humans-in-the-loop, such as a dismounted soldier, should neither adversely affect soldier performance nor create operational burden. New technologies can be exploited to integrate small non-intrusive instrumentation into new platforms during design and development, and, in some cases, into existing platforms. This class of instrumentation can provide the required data for T&E, training, and logistics throughout system lifecycle, and provide the ability to collect critical system performance data during combat missions.

The use of non-intrusive instrumentation for T&E, training, and logistics has the potential to significantly reduce the total ownership cost of new weapon systems while enhancing force readiness. Accordingly, the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01D states that acquisition programs should include embedded instrumentation as part of system trade-off studies and design analyses.

This focus area was established to address the T&E challenges discussed above; however, it has been determined that requirements and transition partners must be better defined and understood. Accordingly, this focus area did not initiate any FY 2008 new start projects, but is developing a new NII T&E technology roadmap to determine the best path forward. Ongoing projects will continue to completion. NII will fund new projects in FY 2010 based upon the roadmap effort.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Non-Intrusive Instrumentation	7.451	6.519	4.846	
FY 2008 Accomplishments: Initiated new NII Roadmap development effort to address T&E technology challenges in this focus area. Continued efforts initiated in prior fiscal years. - Completed Advanced Munitions Flight Test Instrumentation project to develop, fabricate, and flight test a MEMS-based instrumentation module; delivered high-g and low-g accelerometers and a final report.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Completed Digital Communications Test Data Bus project to develop and demonstrate a prototype miniaturized, self-calibrating embedded instrumentation system consisting of smart sensors, a subsystem controller, and a processor. The instrumentation system is capable of operating on missile system power in the operational environment and will be able to support continuous life cycle T&E. - Completed Harsh Environment D-Fiber Sensors project to enhance D-Fiber sensors by improving spectral response, reducing fiber brittleness, and improving sensor packaging. Fiber sensor integrated monitoring was enhanced by developing high speed monitoring and a wavelength sweeping source, which are survivable in extreme environments. - Completed Holographic Memory Cube Upgrade project to harden and optimize performance for terabyte data storage and retrieval. - Completed final phase of the MEMS Fiber Optic Sensors project to develop, test, and deliver advanced integrated pressure, temperature, and shear stress sensors coupled onto optical fibers for non-intrusive T&E of aerospace systems. - Continued High Speed and Temperature Diagnostics project to develop a series of probes to withstand continuous exposure to hypersonic test environments. This effort is developing an optical species probe, total pressure probe, total temperature probe, and Mach/flow angularity probe. The probes will support both ground and flight test of hypersonic vehicles. - Continued MEMS Optical Pressure Sensors project to develop an integrated optical pressure sensor package for on-blade acoustic measurement of pressure patterns. - Continued Multi-Species Gas Sensor Arrays to develop a high temperature, multi-chemical sensor array for analysis of critical constituents in turbine engine exhaust products. - Continued Open Modular Embedded Instrumentation Architecture project to design and develop an open, modular, scalable, embedded system architecture. The architecture has been demonstrated in tests of the Air Force Multi-Megawatt Electric Power System being developed for directed energy weapons applications; a final systems of systems demonstration is planned. - Continued Self Powered Chip project to design a power mixer-supply system integrated circuit, sensor system integrated circuit, and fuel cell-lithium ion brassboard. Efforts continue to test, evaluate, and optimize wireless telemetry and common, off-the-shelf sensor technologies. - Continued Ultra High Dynamics GPS project to develop GPS receivers with high dynamic, multi-frequency, anti-jam capability to provide TSPI in existing GPS-denied environments.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continued Wide Band Location Positioning System project to develop acquisition waveform and algorithms to test acquisition and tracking software and to design and test receiver and transmitter reference frequency. Efforts will provide TSPI in GPS-denied environments such as urban areas. Initiated new research efforts to address T&E technology challenges in this focus area. - Joint Advanced Missile Instrumentation risk reduction project to develop technical solutions for multi-path rejection. - Triply Redundant Integrated Navigation and Asset Visibility System project for TSPI on personnel in GPS-denied test environments. *FY 2009 Plans:* Continue efforts initiated in prior fiscal years. - Complete NII Roadmap effort to develop T&E use cases for identifying and refining technology requirements, potentially for power, data transformation, advanced sensors, and GPS-denied TSPI capabilities. This effort will support the FY 2009 Broad Agency Announcement process for FY 2010 new start selections. - Complete High Speed and Temperature Diagnostics project to develop and demonstrate a series of probes that can withstand continuous exposure to hypersonic test environments. Efforts will focus on completion of fabrication, testing and verification, and analysis of the total temperature probe. - Complete Joint Advanced Missile Instrumentation risk reduction project to develop technical solutions for multi-path rejection. - Complete Multi-Species Gas Sensor Arrays project to develop a high temperature, multi-chemical sensor array for analysis of critical constituents in turbine engine exhaust products. Efforts will focus on system operation demonstrations with a pathfinder test and several additional engine tests. - Complete Open Modular Embedded Instrumentation Architecture project to design and develop an open, modular, scalable, embedded system architecture. Efforts will focus on embedded middleware demonstration development. - Complete Self Powered Chip project to design a power mixer-supply system integrated circuit, sensor system integrated circuit, and fuel cell-lithium ion brassboard. Efforts will focus on subsystems verification, integrated circuit design and testing of the final prototype in a realistic environment.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Complete Ultra High Dynamics GPS project to develop GPS receivers with high dynamic, multi-frequency, and anti-jam capability to provide TSPI in GPS-denied environments. Efforts will focus on algorithm development and integration for the GPS L2 frequency (i.e., 1227.60 MHz), ground segment development, and testing. - Complete Wide Band Location Positioning System project to develop acquisition waveform and algorithms to test acquisition and tracking software and to design and test receiver and transmitter reference frequency. Efforts will focus on fabrication and verification testing of transmitters and receivers; testing in an urban environment; and conducting a military demonstration at Aberdeen Test Center. - Continue Triply Redundant Integrated Navigation and Asset Visibility System project for personnel/ asset location by integrating three components to provide highly accurate and reliable navigation in GPS-denied or degraded testing environments. Initiate BAA in FY 2009 to select efforts for FY 2010 award *FY 2010 Plans:* Continue efforts initiated in prior fiscal years. - Complete Triply Redundant Integrated Navigation and Asset Visibility System project for personnel/ asset location by integrating three components to provide highly accurate and reliable navigation in GPS-denied or degraded testing environments. Efforts will focus on integrating the Theater Positioning System, GPS, and an inertial navigation system. Initiate new efforts for award based on the NII Roadmap effort and BAA process: - Develop advanced micro-power sources to power non-intrusive test instrumentation components via advanced chemistry cells and batteries, energy harvesting devices, active power generators, charging devices, and/or load management devices. - Develop advanced sensor transducers to measure high-temperature, electric field strength, and/or magnetic field strength. - Develop alternative wireless data transport technologies (e.g., free space optical transmission, power bus transmission, transmission through conductive components, etc.). - Develop data transformation software to support virtual/synthetic instrumentation, adaptive computing for self-configuration, and self-calibration of instrumentation.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Develop leading edge electronic component miniaturization technologies (e.g., Application Specific Integrated Circuits and Field Programmable Gate Arrays) for advanced sensor electronics. - Develop instrumentation attachment technologies that are reliable in extreme temperatures and high dynamic environments. - Develop multi-modal transducers capable of measuring two or more phenomena simultaneously (e.g., temperature and pressure) at the same point. - Develop small volume data storage technologies capable of withstanding high shock. - Develop technologies to non-intrusively tap into an optical data bus without injecting optical noise or modifying or corrupting data carried on the bus. - Develop technologies to protect sensor electronics under environmental conditions significantly exceeding MIL-SPEC ranges. - Develop TSPI technologies to support dismounted soldiers in GPS-denied environments such as urban, underground, and dense vegetation.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
5: Directed Energy Test	14.753	16.964	20.419						Continuing	Continuing

A. Mission Description and Budget Item Justification

Directed Energy (DE) test technologies are rapidly transitioning into acquisition programs and Advanced Concept Technology Demonstrations. These weapon technologies, primarily consisting of High Energy Lasers (HEL) and High Power Microwaves (HPM), are outpacing their supporting test technologies. Advancements in HEL and HPM have created a new class of weapon systems in which energy is placed on a target instantaneously; traditional test techniques for evaluating conventional munitions (with flight times ranging from seconds to minutes) are not applicable to DE systems T&E. As a result, new technology solutions are needed to ensure that adequate developmental, live fire, and operational test capabilities are available when DE acquisition programs are ready to test.

DE system and component testing requires two principal assessments: how well the weapon is performing, and the specific interaction of energy and target. The current ability to assess DE systems performance and interactions is based on effects testing, i.e., determining if and when a target was destroyed. Current capabilities do not provide the detailed test data required to understand DE system performance. Military utility of these weapons will be dependent upon the knowledge acquired through T&E to know how much to trust the technologies under development and how best to use them. The T&E/S&T Directed Energy Test focus area is developing the necessary technologies to quantitatively assess HEL and HPM performance and target interaction to support thorough testing of DE systems.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Directed Energy Test	14.753	16.964	20.419	

FY 2008 Accomplishments:

Continued efforts initiated in prior fiscal years.

- Completed Probe-based Irradiance Profiler project to develop a prototype system using a probe and beam camera to determine irradiance on an HEL target. Phase I demonstration effort did not meet accuracy and long range HEL test requirements.
- Completed Reflectance and Data Fusion Model project to develop and demonstrate improved bidirectional reflection distribution function models to predict laser irradiance based on reflected energy measurements from various target material compositions. The effort developed a dynamic data fusion model that supports projection of two-dimensional HEL imagery onto three-dimensional target representations, allowing more detailed analysis of HEL-target interaction during T&E.
- Continued Bi-static Optical Imaging Sensor project to design and fabricate a prototype ground-based HEL diagnostics sensor, and to install and characterize the prototype sensor.

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continued Compact Three-Axis Sensor project to develop a compact, E-O sensor that detects three-axis electric field measurements during HPM irradiation. - Continued Dielectric Antenna Electro-Optical Sensor project to design and fabricate a prototype device consisting of a dielectric resonance antenna and electro-optical (E-O) resonator. - Continued Holographic Target Board project to design, fabricate, and test an HEL target board using photo-thermo-refractive glass to measure HEL irradiance of an incident laser beam. - Continued Laser Protected Antenna project to develop shielding techniques to protect flight termination system antenna from errant HEL irradiation. - Continued Magneto-Optical Field Sensor project to develop fiber-coupled optical sensors using the Faraday effect to non-intrusively capture magnetic fields during HPM irradiation. - Continued Multiple Wave Temperature Sensor project to design a multi-band camera system for target surface temperature measurement. - Continued Quantum Well Infrared Photodetector (QWIP) project to test an integrated QWIP, Near Infrared (NIR) Focal Plane Array, and Computed Tomographic Imaging Spectrometer (CTIS). The prototype camera system will be demonstrated in both lab and field environments. The QWIP/NIR/CTIS camera system will allow off-board analysis of HEL beam interaction with a target to characterize laser weapon performance. - Continued Scanning Target Board project to develop an HPM target board that uses an array of compact, multi-layered patch antennas to map the HPM source power spectrum. - Continued T&E Adaptive Optics System project to integrate and test an adaptive optics system in support of remote measurement of HEL temperature with high spatial and temporal accuracy. The adaptive optics system will be assembled and integrated into the Advanced Pointer Tracker at the HEL System Test Facility and demonstrated in a relevant environment. - Continued Temperature & Irradiance Sensor Matrix project to develop a matrix of conformal, onboard, photoconductive detectors to determine target irradiance and temperature profiles. Initiated new research efforts to address T&E technology challenges in this focus area. - Advanced Polymer Optical Source project to develop non-intrusive, large dynamic range, high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields, and circuit board currents.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Atmospheric Transmission Measurement project to develop stationary, ground-based measurement of slant path transmission and optical turbulence for ranges of approximately 10km and at arbitrary slant paths. - Dual Oscillator Microwave Generation project to extend center frequency of spark gap oscillators from 500MHz to 2.5GHz, providing a test source for improved wide band HPM susceptibility testing. - Heat Flux Sensor Array project to integrate a low-cost, high-resolution temperature sensor with an Inverse Heat Conduction model in an instrument that can determine heat placed on a target by an HEL system. - Inversion-derived Resistive Temperature Sensor project to determine laser energy deposition onto a composite target. - Microwave Rotary Attenuator project to develop automated mechanism for variable power in an HPM narrowband source system. - Spectrographic Magnetic Field Sensor project to develop a non-intrusive point measurement of magnetic fields inside a component or system being exposed to HPM fields. - Temperature Irradiance and Extraction Measurement project to develop an “inverse problem” retrieval solution under HEL engagement based on in-band and out-of-band radiance imagery. - Cine Radiography Imagery Measurement project to develop a compact, flash X-ray source for testing of HPM explosives generators for HPM munitions. Initiated a BAA in FY 2008 to select efforts for FY 2009 award. *FY 2009 Plans:* Continue efforts initiated in prior years. - Complete Bi-static Optical Imaging Sensor project to develop, fabricate, and demonstrate a brass board hyper-spectral imager by utilizing a fiber-based field sensor. Develop the technology to use a bi-static hyper-spectral imager to remotely characterize multiple HEL beam wavelengths and power level signatures to support HEL test events. - Complete T&E Adaptive Optics System project to integrate and test an adaptive optics system in support of remote measurement of HEL temperature with high spatial and temporal accuracy. Integrated the adaptive optics system into the Advanced Pointer Tracker at the HEL System Test Facility.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Complete Quantum Well Infrared Photodetector (QWIP) project to test an integrated QWIP, Near Infrared (NIR) Focal Plane Array, and Computed Tomographic Imaging Spectrometer (CTIS). Demonstrate the prototype camera system in both lab and field environments. The QWIP/NIR/CTIS camera system will allow off-board analysis of HEL beam interaction with a target to characterize the laser weapon performance. - Complete Dielectric Antenna E-O Sensor project to fabricate and test a dielectric antenna with an embedded E-O crystal to measure changes in the electric field during an HPM engagement by allowing non-intrusive measurement of HPM environments with minimal impact on the fields measured. - Complete Holographic Target Board project to design, fabricate, and test large scale holographic HEL target boards using photo-thermo-refractive glass to measure HEL irradiance of the an incident laser beam. - Complete Multiple Wave Temperature Sensor project to integrate multi-band focal plane array, electronics, and operating software, and to characterize the multiple wave temperature sensor performance. - Complete Compact Three-Axis Sensor project to develop a sensor that measures short, pulsed HPM fields in real-time. Efforts will include design and integrate ultra-wideband capable, fast rise-time, high sensitivity, compact sensors for minimal perturbation of the measured field and three-axis polarizations. Test prototype sensor in a relevant environment. - Complete Laser Protected Antenna project to develop laser-hard shielding that does not interfere with antenna performance during HEL testing. Assess flight termination system antenna and component vulnerability in relation to laser irradiation and thermal damage, conduct design trades for protection concepts, and conduct radio frequency (RF) verification tests. - Continue Magneto-Optical Field Sensor project to apply the Faraday Effect at microwave bandwidths at remote locations from light source & detector to measure magnetic fields as well as use the electro-optical effect to measure electric field in order to better understand HPM. Test in a relevant environment. - Continue Scanning Target Board project to develop a system with sufficient resolution to derive energy distribution for direct measurement of primary beam shape of HPM systems and sources in complex environments.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Temperature & Irradiance Sensor Matrix project to develop conformal, externally-mounted micro-sensors to resolve location and intensity of airborne HEL laser spots with minimal aerodynamic & thermal signature effects. - Continue Atmospheric Transmission Measurement project to develop stationary, ground-based measurement of slant path transmission and optical turbulence for ranges of ~ 10km and at arbitrary slant paths. - Continue Heat Flux Sensor Array project to integrate low-cost, high-resolution temperature sensor with an Inverse Heat Conduction model in an instrument that can be used determine heat put on target by an HEL system. - Continue Inversion-derived Resistive Temperature Sensor project to determine laser energy deposition onto a composite target. - Continue Temperature Irradiance and Extraction Measurement project to develop “inverse problem” retrieval solution under HEL engagement based on in-band and out-of-band radiance imagery. - Continue Microwave Rotary Attenuator project to develop automated mechanism for variable power in a High Power Microwave narrowband source system. - Continue Spectrographic Magnetic Field Sensor project to develop a non-intrusive point measurement of magnetic fields inside a component or system being exposed to HPM fields. - Continue Cine Radiography of Explosive HPM Munitions project to develop a compact flash X-ray source for development and testing of explosives driven HPM generators. - Continue Advanced Polymer Optical Source project to develop non-intrusive, large dynamic range and high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields and circuit board currents. - Continue Dual Oscillator Microwave Generation project to extend center frequency of spark gap oscillators up from 500MHz to 2.5GHz, providing a test source for improved wide band High Power Microwave susceptibility testing. - Continue Atmospheric Transmission Measurement project to develop stationary, ground-based measurement of slant path transmission and optical turbulence for ranges of ~ 10km and at arbitrary slant paths.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continue Heat Flux Sensor Array project to integrate low-cost, high-resolution temperature sensor with an Inverse Heat Conduction model in an instrument that can be used determine heat put on target by an HEL system. - Continue Inversion-derived Resistive Temperature Sensor project to determine laser energy deposition onto a composite target. - Continue Temperature Irradiance and Extraction Measurement project to develop “inverse problem” retrieval solution under HEL engagement based on in-band and out-of-band radiance imagery. - Continue Microwave Rotary Attenuator project to develop automated mechanism for variable power in a High Power Microwave narrowband source system. - Continue Spectrographic Magnetic Field Sensor project to develop a non-intrusive point measurement of magnetic fields inside a component or system being exposed to HPM fields. - Continue Cine Radiography Imagery Measurement project to develop a compact flash X-ray source for testing of High Power Microwave explosives generators for HPM munitions. - Continue Advanced Polymer Optical Source project to develop non-intrusive, large dynamic range and high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields and circuit board currents. - Continue Dual Oscillator Microwave Generation project to extend center frequency of spark gap oscillators up from 500MHz to 2.5GHz, providing a test source for improved wide band High Power Microwave susceptibility testing. Initiate new research efforts to address T&E technology challenges in this focus area. - Integrated Electro-Magneto-optic Sensor project to develop a compact, non-intrusive sensor that will measure both Electric Field and Magnetic Field for a system under test under High Power Microwave Irradiation - Skin Heating and Electric Field sensors for in-situ measurement of electric field and skin temperature for use on human targets involved in operational testing of W-band microwave systems testing - Terahertz Imaging Profiler Array project to develop a high spatial resolution imaging system capable of characterizing and testing Terahertz systems. - Precision Radiometric Surface Temperature Measurement project to develop a non-contact surface temperature measurement capability for a system under irradiation from an HEL.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Surface Temperature Estimation Tool project to develop temperature estimation software that extract surface temperature of a system under HEL Irradiation without a priori knowledge of surface emissivity. - Beam Irradiance on Target project to develop an HEL Target Board with high spatial and temporal resolution - Irradiance Imaging System project to develop a remote HEL beam irradiance measurement capability that can measure irradiance at threat irradiance levels. Initiate a BAA in FY 2009 to select efforts for FY 2010 award. *FY 2010 Plans:* Continue efforts initiated in prior fiscal years. - Complete Magneto-Optical Field Sensor project to apply the Faraday Effect at microwave bandwidths at remote locations from light source & detector to measure magnetic fields as well as use the electro-optical effect to measure electric field in order to better understand HPM. Test in a relevant environment. - Complete Temperature & Irradiance Sensor Matrix project to develop conformal, externally-mounted micro-sensors to resolve location and intensity of airborne HEL laser spots with minimal aerodynamic & thermal signature effects. - Complete Heat Flux Sensor Array project to integrate low-cost, high-resolution temperature sensor with an Inverse Heat Conduction model in an instrument that can be used determine heat put on target by an HEL system. - Continue Scanning Target Board project to develop a system with sufficient resolution to derive energy distribution for direct measurement of primary beam shape of HPM systems and sources in complex environments. - Continue Atmospheric Transmission Measurement project to develop stationary, ground-based measurement of slant path transmission and optical turbulence for ranges of ~ 10km and at arbitrary slant paths. - Continue Inversion-derived Resistive Temperature Sensor project to determine laser energy deposition onto a composite target. - Continue Temperature Irradiance and Extraction Measurement project to develop “inverse problem” retrieval solution under HEL engagement based on in-band and out-of-band radiance imagery.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Microwave Rotary Attenuator project to develop automated mechanism for variable power in a High Power Microwave narrowband source system. - Continue Spectrographic Magnetic Field Sensor project to develop a non-intrusive point measurement of magnetic fields inside a component or system being exposed to HPM fields. - Continue Cine Radiography of Explosive HPM Munitions project to develop a compact flash X-ray source for development and testing of explosives driven HPM generators. - Continue Advanced Polymer Optical Source project to develop non-intrusive, large dynamic range and high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields and circuit board currents. - Continue Dual Oscillator Microwave Generation project to extend center frequency of spark gap oscillators up from 500MHz to 2.5GHz, providing a test source for improved wide band High Power Microwave susceptibility testing. - Continue Atmospheric Transmission Measurement project to develop stationary, ground-based measurement of slant path transmission and optical turbulence for ranges of ~ 10km and at arbitrary slant paths. - Continue Heat Flux Sensor Array project to integrate low-cost, high-resolution temperature sensor with an Inverse Heat Conduction model in an instrument that can be used determine heat put on target by an HEL system. - Continue Inversion-derived Resistive Temperature Sensor project to determine laser energy deposition onto a composite target. - Continue Temperature Irradiance and Extraction Measurement project to develop “inverse problem” retrieval solution under HEL engagement based on in-band and out-of-band radiance imagery. - Continue Microwave Rotary Attenuator project to develop automated mechanism for variable power in a High Power Microwave narrowband source system. - Continue Spectrographic Magnetic Field Sensor project to develop a non-intrusive point measurement of magnetic fields inside a component or system being exposed to HPM fields. - Continue Cine Radiography Imagery Measurement project to develop a compact flash X-ray source for testing of High Power Microwave explosives generators for HPM munitions.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continue Advanced Polymer Optical Source project to develop non-intrusive, large dynamic range and high bandwidth sensor to measure incident HPM magnetic field amplitude, internal cavity fields and circuit board currents. - Continue Dual Oscillator Microwave Generation project to extend center frequency of spark gap oscillators up from 500MHz to 2.5GHz, providing a test source for improved wide band High Power Microwave susceptibility testing. - Continue Integrated Electro-Magneto-optic Sensor project to develop a compact, non-intrusive sensor that will measure both Electric Field and Magnetic Field for a system under test under High Power Microwave Irradiation - Continue Skin Heating and Electric Field sensors for in-situ measurement of electric field and skin temperature for use on human targets involved in operational testing of W-band microwave systems testing - Continue Terahertz Imaging Profiler Array project to develop a high spatial resolution imaging system capable of characterizing and testing Terahertz systems. - Continue Precision Radiometric Surface Temperature Measurement project to develop a non-contact surface temperature measurement capability for a system under irradiation from an HEL. - Continue Surface Temperature Estimation Tool project to develop temperature estimation software that extract surface temperature of a system under HEL Irradiation without a priori knowledge of surface emissivity. - Continue Beam Irradiance on Target project to develop an HEL Target Board with high spatial and temporal resolution - Continue Irradiance Imaging System project to develop a remote HEL beam irradiance measurement capability that can measure irradiance at threat irradiance levels. Initiate new projects selected in FY2010 BAA process. Initiate a BAA in FY 2010 to select efforts for FY 2011 award.				

C. Other Program Funding Summary ($ in Millions)

N/A

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D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
6: Netcentric Systems Test	8.807	12.254	12.477						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Netcentric Systems Test (NST) focus area is pursuing technologies to keep pace with the advancements in Joint Net-Centric Operations (JNO) requirements for Test & Evaluation (T&E). These advanced Netcentric Systems will address the needs of the Joint force and coalition partners who must have rapid access to relevant, accurate, and timely information, and also the ability to create and share the knowledge required to make superior decisions in an assured environment amid unprecedented quantities of operational data. This will enable the JNO to meet the requirement to provide an integrated global network enabling the ability to share the right information at the right time so that Warfighters can act before the enemy acts. JNO links a multitude of people, sensors, operating centers, and decision aids. These sources of information produce relevant, up-to-the second, accurate, and credible information to allow informed decisions in routine, planned, or crisis events. The result – faster decision making, increased collaboration, and better decisions based on access to more information. Successful implementation of these transformational capabilities will necessitate a corresponding transformation in the ability of DoD to test and evaluate netcentric systems. The NST focus area addresses the T&E scenarios, technologies, and analysis tools required to ensure that operational networked systems delivered to the warfighter provide an assured capability to acquire, verify, protect, and assimilate information necessary for battlefield dominance within a complex netcentric environment.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Netcentric Systems Test	8.807	12.254	12.477	
FY 2008 Accomplishments: The NST Focus Area provided numerous briefs throughout the year to socialize and receive critical input from various subject matter experts in the T&E/S&T field. The input received has facilitated further tailoring of the NST focus area to better provide risk mitigation and advanced technologies in support of the Central Test & Evaluation Investment Program (CTEIP) Joint Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Interoperability T&E Capability (InterTEC) project, as well as numerous other potential transition partners. Continued projects initiated in prior fiscal years. - Completed Middleware Enhancements for Netcentric Simulation Architecture (MENSA) efforts to develop and demonstrate a network coding technology that will enable a gain by a factor of two or more in testing middleware communication throughput over test networks.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Completed Verification for Netcentric Simulations (VNS) effort to develop a quantitative verification methodology for netcentric simulations based on metrics that adequately characterize system performance and effectiveness. - Completed Net Ready Architecture Evaluator (NetRAE), formally Service Oriented Architecture Toolset (SOAT), effort to develop and deliver a toolset to extract critical data from system architecture, and provide compliance to network-ready key performance parameter. - Completed Configurable Situational Awareness Displays (CSAD) effort to develop and demonstrate the creation of a composable 3D visualization tool, capable of centralized control of distributed situational awareness displays for netcentric information operations and communications effects. - Completed Netcentric Systems Test Architecture and Technology Insertion Environment (TIE) effort to develop architecture, tools and a laboratory to integrate, demonstrate and validate NST technology projects. - Continued Dynamic Distributed Networking for Test and Evaluation (DDNTE) effort to develop tools to dynamically configure Netcentric Systems Test infrastructure communications networks. - Continued Joint Virtual Network Centric Warfare (JVNCW) effort to develop the capability to build, test, evaluate, and optimize large-scale, real-time communication networks integrated with hardware, software, external systems, test ranges, and warfighters. - Continued Dynamic Utility for Collaborative Architecture-Centric T&E (DUCAT) (Formerly Technology and Tools For Joint Testing, TTJT) effort to prototype T&E tools for developing test architectures, assigning test measures, and visualizing and testing Joint command and control systems in a service oriented architecture environment. - Continued Executable Architecture Analysis Modeling (EAAM) effort to develop test technologies and create executable models of netcentric architectures comprised of integrated combat, communications and process models. - Continued Technologies for Tactical Video (TTV) and demonstrate a battlespace awareness tool that integrates sensor imagery data with other Joint Mission Effectiveness (JMe) test data projected in distributed network environment. - Continued Analyzer for Netcentric Systems Test Confederations (ANSC) effort to develop and demonstrate web-based technologies to automate Netcentric test planning and scenario development.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continued Flexible Analysis Services (FAS) effort to develop and demonstrate generic message protocol translation prototypes (initially for Link 16 capability) with a parser rule and profile creation user interface and a generic message parser. Initiated new research efforts to address T&E technology challenges in this focus area. - Joint Mission Environment Support Using Data Farming (JMEDF) (formally Cognitive Capabilities for Data Farming (CCDF)) effort to develop models capturing the C2 structures, Design of Experiment (DOE), Rapid Scenario Generation, and Automated Red Teaming. - Irregular Warfare Effects Mode (IWEM), formally Effects Based Approach to Operations (EBAO), effort to develop modeling technologies for conventional and unconventional effects of Information Operations actions. - Multi-Level Security Cross Layer Scheme (MLSCLS) effort to build multi-level security features into distributed, decentralized, quality of service medium access control while preserving power and bandwidth. - Policy-based Adaptive Network and Security Management Technology for Network Centric Systems Testing (PAM), formerly Policy Based Adaptive Network (PBAN) effort to develop a policy based management system for controlling cross-domain multi-level security and automated network Quality of Service controls through recognition of Test and Training Enabling Architecture (TENA) based applications. - Rapid Reconfiguration Intelligent Module (RRIM) effort to develop a rapid reconfigurable control station prototype to individually or simultaneously control 200 computers to minimize setup time and maximize time for testing. - Service Oriented Architectures (SOA) to Distributed Testing Infrastructure Study effort to assess on-going testing activities using SOA and the technical maturity of those SOA-based testing tools to determine the suitability of SOA-based tools to support distributed testing data management requirements; the benefits of modernizing test instrumentation to use a SOA for distributed testing; and the benefits of modernizing distributed test tools to use a SOA for distributed testing. Initiated a BAA in FY 2008 to select efforts for FY 2009 award.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Continue efforts initiated in prior years. - Complete Executable Architecture Analysis Modeling (EAAM) effort to develop test technologies and create executable models of netcentric architectures comprised of integrated combat, communications and process models. - Complete Dynamic Utility for Collaborative Architecture-Centric T&E (DUCAT) effort to prototype T&E tools for developing test architectures, assigning test measures, visualizing and testing Joint command and control systems in a service oriented architecture environment. - Complete Analyzer for Netcentric Systems Test Confederations (ANSC) effort to develop and demonstrate web-based technologies to automate Netcentric test planning and scenario development. - Complete Joint Virtual Network Centric Warfare (JVNCW) effort to develop the capability to build, test, evaluate, and optimize large-scale, real-time communication networks integrated with hardware, software, external systems, test ranges, and warfighters. - Complete Technologies for Tactical Video (TTV) effort and demonstrate a battlespace awareness tool that integrates sensor imagery data with other Joint Mission Effectiveness (JMe) test data projected in distributed network environment. - Complete Flexible Analysis Services (FAS) effort to develop and demonstrate generic message protocol translation prototypes (initially Link 16 capability) with a parser rule and profile creation user interface and a generic message parser. - Complete Reconfiguration Intelligent Module (RRIM) effort to develop a rapid reconfigurable control station prototype to individually or simultaneously control 200 computers to minimize setup time and maximize time for testing. - Complete Service Oriented Architectures (SOA) to Distributed Testing Infrastructure Study effort to assess on-going testing activities using SOA and the technical maturity of the SOA-based testing tools. - Continue Dynamic Distributed Networking for Test and Evaluation (DDNTE) effort to develop tools to dynamically configure Netcentric Systems Test infrastructure communications networks. - Continue Joint Mission Environment Support Using Data Farming (JMEDF) effort to develop models capturing the C2 structures, Design of Experiment (DOE), Rapid Scenario Generation, and Automated Red Teaming.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Irregular Warfare Effects Mode (IWEM) effort to develop modeling technologies for conventional and unconventional effects of Information Operations actions. - Continue Multi-Level Security Cross Layer Scheme (MLSCLS) effort to build multi-level security features into distributed, decentralized, quality of service medium access control while preserving power and bandwidth. - Continue Policy-based Adaptive Network and Security Management Technology for Network Centric Systems Testing (PAM) effort to develop a policy based management system for controlling cross-domain multi-level security and automated network Quality of Service controls through recognition of Test and Training Enabling Architecture (TENA) based applications. Initiate new research efforts to address T&E technology challenges in this focus area. - Middleware Enhancements to Netcentric Simulation Architecture Follow-On (MFP) effort to refine coding techniques to accurately address InterTEC testing requirements. Dynamically optimize information delivery, minimize network congestive failures, and overcome unreliable network environments. - Netcentric Environment Instrumentation and Visualization (NEIV) effort to develop intelligent T&E analytic and visualization tools that will support joint mission effectiveness, net readiness, and joint interoperability evaluation requirements. - Netcentric Systems Test Evaluation Capability Module (NECM) effort to effectively characterize and replicate the Joint Netcentric Operation mission threads, architectures, and measures within the interoperability T&E enterprise. - Test and Training Enabling Architecture (TENA) in a Resource Constrained Environment (TRCE) effort to develop technologies that will recreate the Netcentric Battlespace with increased bandwidth that will support high data rate users with the flexibility to transmit critical information at higher priorities. - Modern Link Manager Protocols (MLMP) effort to develop capability to pass only the required information and the enable the flexibility to deal with unreliable networks. - Net-Ready Key Performance Parameter (NR-KPP) Integrated Architecture (FEND) effort to develop capability to automate testing of the NR-KPP integrated architecture element and visualize the execution of mission threads. Initiate BAA in FY 2009 to select efforts for FY 2010 award.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Continue efforts initiated in prior years. - Complete Dynamic Distributed Networking for Test and Evaluation (DDNTE) effort to develop tools to dynamically configure Netcentric Systems Test infrastructure communications networks. - Complete Joint Mission Environment Support Using Data Farming (JMEDF) effort to develop models capturing the C2 structures, Design of Experiment (DOE), Rapid Scenario Generation, and Automated Red Teaming. - Complete Multi-Level Security Cross Layer Scheme (MLSCLS) effort to build multi-level security features into distributed, decentralized, quality of service medium access control while preserving power and bandwidth. - Complete Net-Ready Key Performance Parameter (NR-KPP) Integrated Architecture (FEND) effort to develop capability to automate testing of the NR-KPP integrated architecture element and visualize the execution of mission threads. - Complete Modern Link Manager Protocols (MLMP) effort to develop capability to pass only the required information and the enable the flexibility to deal with unreliable networks. - Complete Netcentric Systems Test Evaluation Capability Module (NECM) effort to effectively characterize and replicate the Joint Netcentric Operation mission threads, architectures, and measures within the interoperatbility T&E enterprise. - Continue Irregular Warfare Effects Mode (IWEM)effort to develop modeling technologies for conventional and unconventional effects of Information Operations actions. - Continue Middleware Enhancements to Netcentric Simulation Architecture Follow-On (MFP) effort to refine coding techniques to accurately address InterTEC testing requirements. Dynamically optimize information delivery, minimize network congestive failures, and overcome unreliable network environments. - Continue Policy-based Adaptive Network and Security Management Technology for Network Centric Systems Testing (PAM) effort to develop a policy based management system for controlling cross-domain multi-level security and automated network Quality of Service controls through recognition of Test and Training Enabling Architecture (TENA) based applications.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Continue Netcentric Environment Instrumentation and Visualization (NEIV) effort to develop intelligent T&E analytic and visualization tools that will support joint mission effectiveness, net readiness, and joint interoperability evaluation requirements. - Continue Test and Training Enabling Architecture (TENA) in a Resource Constrained Environment (TRCE) effort to develop technologies that will recreate the Netcentric Battlespace with increased bandwidth that will support high data rate users with the flexibility to transmit critical information at higher priorities. Initiate BAA in FY 2010 to select efforts for FY 2011 award.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
7: Unmanned and Autonomous System Test	3.998	5.465	6.371						Continuing	Continuing

A. Mission Description and Budget Item Justification

The next generation of unmanned warfighting support systems is in development and will rapidly transition from research efforts into acquisition programs. In addition, on-going research into autonomous and semi-autonomous systems indicates such systems will soon emerge as a new test challenge. The Unmanned and Autonomous Systems Test (UAST) focus area addresses current and emerging challenges associated with T&E of these important warfighting assets. As the complexity of Unmanned and Autonomous Systems (UAS) increases, the capability to test these systems must be developed, also. UAS T&E technology advancements are required to enable testing of the behavior of learning unmanned and autonomous systems. Ranges and installed system test facilities must be able to characterize UAS responses to mission priorities in densely-packed battlespaces and predict from the data how these systems will respond in the future. The Department of Defense must have the capability to test the ability of these systems to interact safely and effectively with large groups of humans and to determine how these systems respond to unscripted scenarios. This capability requires the development of technology to collect and compare accurate situational awareness of autonomous systems with ground truth; test unmanned systems in a netcentric environment; maintain non-line-of-sight tracking; and execute controlled, repetitive, and realistic stimulation of systems under test.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Unmanned and Autonomous System Test	3.998	5.465	6.371	
FY 2008 Accomplishments: Continued efforts initiated in prior fiscal years. - Completed Flexible Command and Control project to develop a communications bus that permits operation of multiple UAS platforms within a precisely prescribed environment that can be monitored and controlled locally or widely distributed over the test infrastructure. - Completed Software Configurable Multi-Channel Transceiver project to develop flexible, multiband, command and control communications systems to support data capture during complex multi-agent UAS test scenarios that address the unique test aspects of UAS communications, range safety and vehicle performance. - Continued High Fidelity Communication Modeling and Analysis project to develop M&S tools to provide controlled, repetitive, realistic stimulation of systems under test.				

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continued Intelligent Agent Based Framework project to develop software-based preplanning techniques which properly characterize communications links to support UAS operations in complex environments. - Continued Micro-beacon Tracking of Autonomous Systems project to develop TSPI instrumentation by building a tracking station architecture consisting of antennae and signal processing. - Continued Reconfigurable Wireless Measurement System project to develop a three-board wireless sensor stack (consisting of GPS, data acquisition, telemetry, and analog to digital converter components) for both truth and perceived truth data. - Continued Remote Embedded Systems Test project to develop and integrate long duration, lightweight, hybrid power/energy minimization and power switching systems for reliable UAS operation of onboard sensors and data transmission devices. Initiated research efforts to address T&E technology challenges in this focus area. - Cognitive Autonomous Systems-of-Systems Tester project to develop the ability to test collaboration capabilities in multiple agent unmanned and autonomous vehicle settings. - Software and Hardware for Multi-Resolution Maps/Models project to develop multi-level situational awareness models. - Virtual Autonomous Teaming Tool Test Configuration project to predict the changes produced within UAS as a result of modifications to external stimuli. Initiated BAA in FY 2008 to select efforts for FY 2009 award. *FY 2009 Plans:* Continue efforts initiated in prior fiscal years. - Complete Intelligent Agent Based Framework project to develop preplanning techniques which properly characterize communications links to support UAS operations in complex environments. - Complete Remote Embedded Systems Test project to improve power summing by controlling power distribution and improve extensions to increase connectivity with multiple vehicle systems under test. - Complete Micro-beacon Tracking of Autonomous Systems project to develop non-obtrusive TSPI instrumentation by optimizing power consumption.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continue Reconfigurable Wireless Measurement System project to develop non-intrusive test instrumentation for real-time measurement by reducing size to a two-board processor stack consisting of sensors, data storage, and telemetry units. - Continue High Fidelity Communication Modeling and Analysis project to develop M&S tools to provide controlled, repetitive, realistic stimulation of systems under test. - Continue Software and Hardware for Multi-Resolution Maps/Models project to develop analytical software integrating diverse bits of data into standard multilevel situational awareness models. - Continue Cognitive Autonomous Systems-of-Systems Tester project to develop the ability to test collaboration and utilization capabilities in multiple agent unmanned and autonomous vehicle settings. - Continue Virtual Autonomous Teaming Tool Test Configuration project to predict the changes produced within UAS as a result of modifications to external stimuli. Initiate new research efforts to address T&E technology challenges in the focus area. - Develop Prescriptive and Adaptive Framework (PATFrame) to serve as a foundation for a new Unmanned and Autonomous Systems test and evaluation paradigm. Objectives include determine the best in class test strategies available across industry and government through a descriptive framework; and develop a prescriptive framework for improving decision making according to normative and descriptive standards. - Develop Simulated Cooperative Unmanned Underwater Laboratory (SCUUL) to address specific UAST needs including (1) modeling of cooperative Unmanned Undersea Vehicle (UUV) or Unmanned Surface Vehicle (USV) navigation in high currents and surface winds; (2) modeling the impact of communication limitations on cooperative UUV/USV behavior; (3) developing measures of performance and effectiveness for cooperative UUV/USV sampling and (4) operator interfaces to multi-vehicle teams. Investigators will perform applied research in model-based multi-target tracking in support of the design of a micro-UUV Testbed. - Develop methods for testing autonomous space systems (e.g. accessibility, latency, safety/health hazards, etc.) in an operationally relevant environment. - Develop tools to evaluate the cognitive behavior and predict future performance of learning algorithms in semi-autonomous and autonomous systems. Initiate a BAA in FY 2009 to select efforts for FY 2010 award.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: Continue efforts initiated in prior fiscal years. - Complete Cognitive Autonomous Systems-of-Systems Tester project to develop ability to test collaboration and utilization capabilities in multiple agent unmanned and autonomous vehicle settings. - Complete High Fidelity Communication Modeling and Analysis project to develop tools to provide controlled, repetitive, and realistic stimulation of systems under test. - Complete Reconfigurable Wireless Measurement System project to develop non-intrusive test instrumentation for real-time measurement and UAS tracking. - Complete Software and Hardware for Multi-Resolution Maps/Models project to develop analytical software integrating diverse bits of data into standard multi-level situational awareness models. - Complete Virtual Autonomous Teaming Tool Test Configuration project to predict the changes produced within UAS as a result of modifications to external stimuli. - Continue Evolutionary Path Planning Algorithm project to develop the ability to test autonomous systems decision making software. - Continue Genetic Cognitive Algorithm Assessments project to evaluate response of stimulated autonomous systems. - Continue Ground Control System Architecture Test Tool project to develop Control System Architecture evaluation tool to aid new unmanned and autonomous system insertion into theater while not negatively intruding upon function of ongoing warfighting efforts. - Continue Simulated Environment System Data Capture project to provide stimulus and track vehicle sensory, perception, and response plan by developing data perception and decision tracking software. Initiate a BAA in FY 2010 to select efforts for FY 2011 award.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

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E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
8: Common Range Integrated Instrumentation System	0.000	15.000	10.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The Department of Defense has a critical need for enhanced T&E instrumentation to support advanced aircraft, avionics, and weapons system testing. The Common Range Integrated Instrumentation System (CRIIS) is a tri-service project that provides a family of capabilities to improve time-space-position information (TSPI) accuracy in low- to high-dynamic test environments and data link throughput capabilities using spectrally efficient data links. CRIIS participant packages will be highly miniaturized in both pod-mounted and internally mounted configurations. CRIIS is highly dependent upon advanced technology development in the areas of high-accuracy TSPI and spectrally efficient, high throughput data transmission. CRIIS will replace the aging Advanced Ranged Data System (ARDS) developed in the mid-1980s. ARDS suffers from parts obsolescence and will not provide accuracies and data throughput required by advanced weapon systems.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Common Range Integrated Instrumentation System	0.000	15.000	10.000	
FY 2008 Accomplishments: N/A				
FY 2009 Plans: - Begin Phase 1 risk reduction and technology maturation for high throughput, spectrally efficient data link. - Begin Phase 1 risk reduction and technology maturation for high accuracy TSPI. - Conduct System Requirements Reviews, Interim Baseline Review #1, and System Functional Reviews. - Complete Phase 1 risk reduction and technology maturation for high throughput, spectrally efficient data link. - Complete Phase 1 risk reduction and technology maturation for high accuracy TSPI. - Conduct Interim Baseline Review #2 and successful Preliminary Design Review. - Accomplish field test demonstration and Technology Readiness Assessment. - Down select to a single prime contractor.				

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2010 Plans: - Complete Phase 1 risk reduction and technology maturation for high throughput, spectrally efficient data link. - Complete Phase 1 risk reduction and technology maturation for high accuracy TSPI. - Conduct Interim Baseline Review #2 and successful Preliminary Design Review. - Accomplish field test demonstration and Technology Readiness Assessment. - Down select to a single prime contractor.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

The CRIIS program acquisition strategy is comprised of a competitive risk reduction phase followed by a down select to accomplish System Design and Demonstration (SDD) and production. A Technology Readiness Assessment conducted in the summer of 2006 revealed key technologies as immature and was the basis of this approach. The Department plans to conduct the risk reduction effort for approximately two years or until one of the contractors has fallen outside the competitive range and further expenditure of funds would not provide value to the government, based on established criteria. The Department will issue the final RFP for down select 90 days before the possible down select point calling for proposal not later than 60 days before the down select point. The complete details for the down select criteria are currently in development.

E. Performance Metrics

N/A

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
9: Multi-Level Security	0.000	0.000	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Multilevel security (MLS) has posed a challenge to the computer security community since the 1960s. MLS will allow information to flow freely between recipients in a computing system who have appropriate security clearances while preventing leaks to unauthorized recipients. MLS systems must incorporate two essential features: first, the system must enforce these restrictions regardless of the actions of system users or administrators, and second, MLS systems must enforce these restrictions with incredibly high reliability. This has led developers to implement specialized security mechanisms and to apply sophisticated techniques to review, analyze, and test those mechanisms for correct and reliable behavior.

Despite this, MLS systems have rarely provided the degree of security desired by their most demanding customers in the military services, intelligence organizations, and T&E activities. Incorporating MLS into telemetry for T&E would allow all users of the data to have access to the same data stream and computer network according to their security clearance level and need-to-know. This would significantly increase efficiency and generate cost savings. MLS will also allow more streamlined testing with coalition partners.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Multi-Level Security	0.000	0.000	0.000	
FY 2008 Accomplishments: N/A				
FY 2009 Plans: N/A				
FY 2010 Plans: N/A				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

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E. Performance Metrics

N/A

Exhibit R-2, PB 2010 Office of Secretary Of Defense **RDT&E Budget Item Justification**	**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603942D8Z Technology Transfer

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	7.119	5.738	2.219						Continuing	Continuing
P942: Technology Link	7.119	5.738	2.219						Continuing	Continuing

A. Mission Description and Budget Item Justification

Defense Technology Transfer was referred to in previous budgets as Defense Technology Link (TechLink). This program title change serves to distinguish the Technology Transfer program from one of the program's successful contractors, TechLink of Montana State University.

DoD's Domestic Technology Transfer Program facilitates the transfer of DoD technologies to U.S. businesses for the continued research, development, and production to meet military requirements, as well as commercial applications, through the use of technology transfer mechanisms such as Cooperative Research and Development Agreements (CRADAs), Patent License Agreements (PLAs), Educational Partnership Agreements (EPAs), and State/Local Government partnerships. Partnership Intermediaries facilitate technology transfer efforts on a decentralized/ regional basis. A partnership intermediary, called TechLink, assists the DoD in its technology transfer efforts.

Technology Transfer is cost-effective and has provided a return on the investment to DoD of 4:1 on funds expended to date. This organization accounts for about 30 percent of all DoD patent license agreements (PLAs) and has brokered over 400 Cooperative Research and Development Agreements (CRADAs) and other Research and Development (R&D) partnerships involving innovative companies new to DoD.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	5.784	2.170	2.259	
Current BES/President's Budget	7.119	5.738	2.219	
Total Adjustments	1.335	3.568	-0.040	
Congressional Program Reductions				
Congressional Rescissions		-0.032		
Total Congressional Increases		3.600		
Total Reprogrammings	1.500			
SBIR/STTR Transfer	-0.153			
Internal realignment of funds	-0.012		-0.011	
Other			-0.029	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: P942, **Firstlink** FirstLink is officially called the Department of Defense's National Center of Excellence for Commercialization and Technology Transfer for First Responder Technologies.	0.000	2.000
Project: P942, **MilTech Expansion Program** MilTech Expansion is an effort to facilitate Technology Transfer functions, focused specifically on providing critical engineering, manufacturing, and business development assistance to small companies. The FY 2008 congressional add was misplaced against a DARPA Program Element (PE) and was reprogrammed into the Technology Transfer PE.	0.000	1.600

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
P942: Technology Link	7.119	5.738	2.219						Continuing	Continuing

A. Mission Description and Budget Item Justification

Defense Technology Transfer was referred to in previous budgets as Defense Technology Link (TechLink). This change serves to distinguish the Technology Transfer program from one of the program's successful contractors, TechLink of Montana State University.

DoD's Domestic Technology Transfer Program facilitates the transfer of DoD technologies to U.S. businesses for the continued research, development, and production to meet military requirements, as well as commercial applications, through the use of technology transfer mechanisms such as Cooperative Research and Development Agreements (CRADAs), Patent License Agreements (PLAs), Educational Partnership Agreements (EPAs), and State/Local Government partnerships. Partnership Intermediaries facilitate technology transfer efforts on a decentralized/ regional basis. A partnership intermediary, called TechLink, assists the DoD in its technology transfer efforts.

Technology Transfer is highly cost-effective with elements of T2 achieving Return on Investment (ROI) to DoD. For example, TechLink and has provided a ROI to DoD of 4:1 on funds expended to date. This organization currently accounts for 30 percent of all DoD patent license agreements (PLA) and has brokered over 400 Cooperative Research and Development Agreements (CRADA) and other Research and Development (R&D) partnerships involving innovative companies new to DoD.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Dual Use Technology Development	0.552	0.561	0.584	

Actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. This activity will particularly focus on nontraditional defense contractors and is intended (1) to help lower the expense of new defense-related technology development through cost-sharing with industry, and (2) to help DoD benefit from private-sector technology investments and innovations.

FY 2008 Accomplishments:
Actively promoted and brokered Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. Continued to provide critical support to DoD labs by facilitating 30% of all of DoD's Patent License Agreements (PLAs) for the fiscal year. Also brokered over 35 new CRADAs between DoD labs

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
and industry, thereby enabling DoD and industry to leverage technology development efforts by both parties. *FY 2009 Plans:* Continue to actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. Broker new CRADAs between DoD labs and industry, thereby enabling DoD and industry to leverage technology development efforts by both parties. *FY 2010 Plans:* Continue to actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. Broker new CRADAs between DoD labs and industry, thereby enabling DoD and industry to leverage technology development efforts by both parties.				
Marketing of DoD technologies Actively market DoD-developed technologies to US companies to establish Patent License Agreements to commercialize these technologies for both civilian and military applications. The multiple objectives of this technology marketing activity are to (1) accelerate the transition of DoD-developed technologies to the warfighter; (2) lower the cost of DoD technology acquisition by developing a larger commercial market for dual-use technologies; (3) provide a return of revenue to DoD labs from commercial spin-off of defense technologies; and (4) fulfill DoD's Congressionally mandated technology transfer directives. *FY 2008 Accomplishments:* Actively marketed DoD-developed technologies to US companies and established Patent License Agreements to commercialize these technologies for both civilian and military applications. As an example, TechLink (Montana State University)), the Technology Transfer contractor, facilitated two licensing agreements for a revolutionary new Navy-developed corrosion prevention compound known as "Navguard." Developed by the Naval Air Systems Command - Patuxent River, this technology	1.300	1.295	1.320	

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B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
promises to save the DoD millions of dollars annually in its corrosion prevention on military air frames, ships, and ground vehicles. TechLink marketed Navguard nationally. Two companies decided to license the technology for commercialization: Armick, Inc. of Kentwood, MI - which offers contract cleaning and corrosion-control services for military and civilian aircraft; and Corrosion Technologies Corporation of Dallas, TX - which offers a full line of rust and corrosion control products for military, defense industry, and other customers. *FY 2009 Plans:* Continue active marketing of DoD-developed technologies to US companies to establish Patent License Agreements to commercialize these technologies for both civilian and military applications. *FY 2010 Plans:* Continue active marketing of DoD-developed technologies to US companies to establish Patent License Agreements to commercialize these technologies for both civilian and military applications.				
Spin-In of Advanced Commercial-Sector Technologies Actively promote the DoD Small Business Innovation Research (SBIR) (focus on Phase III contracts) and Independent Research and Development (IR&D) programs to companies throughout the United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems. *FY 2008 Accomplishments:* Actively promoted the DoD Small Business Innovation Research (SBIR) (focus on Phase III contracts) and Independent Research and Development (IR&D) programs to companies throughout the United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems. As an example, TenXsys, Inc. is a technology firm in Eagle, ID that specializes in networked sensor systems for biological monitoring. TechLink (Montana State University), the Technology Transfer contractor, assisted TenXsys in winning US Army Research Institute of Environmental Medicine	0.304	0.302	0.315	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
sponsored Phase I and II SBIR awards for an advanced physiological monitoring system for amputees that accelerates the rehabilitation of soldiers with prothestic devices. To help TenXsys with further development of its Phase II technology, TechLink supported TenXsys in meetings with In-Q-Tel, the Central Intelligence Agency's venture capital arm. As a result of these interactions, In-Q-Tel made a major investment in TenXsys to support development of specialized field-capable advanced telemetry technology in support of US intelligence activities. *FY 2009 Plans:* Continue to actively promote the DoD Small Business Innovation Research (SBIR) (focus on Phase III contracts) and Independent Research and Development (IR&D) programs to companies throughout the United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems. *FY 2010 Plans:* Continue to actively promote the DoD Small Business Innovation Research (SBIR) (focus on Phase III contracts) and Independent Research and Development (IR&D) programs to companies throughout the United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems.				
FirstLink FirstLink - a congressionally added effort - is officially called the Department of Defense's National Center of Excellence for Commercialization and Technology Transfer for First Responder Technologies. *FY 2008 Accomplishments:* FirstLink assessed user needs and priorities, collected and evaluated potential DoD technologies for first responder use, identified non-DoD technologies that address DoD and first responder needs, and created and executed a marketing plan for these technologies. Measures of success include technologies made available for first responder use.	1.539	1.989	0.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense **RDT&E Project Justification**		**DATE:** May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603942D8Z Technology Transfer	**PROJECT NUMBER** P942

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: Assess user needs and priorities, collect and evaluate potential DoD technologies for first responder use, identify non-DoD technologies that address DoD and first responder needs, and create and execute a marketing plan for these technologies. Measures of success include technologies made available for first responder use.				
MilTech Expansion Program MilTech Expansion is a congressionally added effort to facilitate Technology Transfer functions, focused specifically on providing critical engineering, manufacturing, and business development assistance to small companies. MilTech is a non-profit entity of Montana State University. *FY 2008 Accomplishments:* Assisted the transition of technologies from innovative small companies to DoD operational use, supporting the Technology Transfer functions of marketing of DoD technologies, dual use technology deployment, and spin-in of advanced commercial-sector technologies. As an example, MilTech (Montana State University), the Technology Transfer contractor, helped Crimson Trace Corporation, Beaverton, OR, to ruggedize and waterproof its "Lasergrips" sighting system for pistols. Squeezing the pistol grips activates an eye-safe red laser beam that indicates precisely where the pistol is pointing. This device reduces pistol training time, discourages would-be attackers, and increases lethality. Special Operations Command (SOCOM) and other DoD branches asked Crimson Trace to enhance the Lasergrips by ruggedizing the switch mechanism and making the circuitry waterproof. Crimson Trace lacked the in-house expertise to undertake design modifications requested by DoD. MilTech assisted by working with a design group familiar with military specifications, and Crimson Trace selected among three design options. The result was a collaborative effort that resulted in improved technology to meet DoD needs and was applicable to civilian requirements.	1.500	1.591	0.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603942D8Z Technology Transfer	PROJECT NUMBER P942

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: Will assisted the transition of technologies from innovative small companies to DoD operational use, supporting the Technology Transfer functions of marketing of DoD technologies, dual use technology deployment, and spin-in of advanced commercial-sector technologies. As as example, MilTech will help Crimson Trace Corporation, Beaverton, OR, to ruggedize and waterproof its "Lasergrips" sighting system for pistols. Squeezing the pistol grips activates an eye-safe red laser beam that indicates precisely where the pistol is pointing. This device reduces pistol training time, discourages would-be attackers, and increases lethality. SOCOM and other DoD branches asked Crimson Trace to enhance the Lasergrips by ruggedizing the switch mechanism and making the circuitry waterproof. Crimson Trace lacked the in-house expertise to undertake design modifications requested by DoD. MilTech assisted by working with a design group familiar with military specifications, and Crimson Trace selected among three design options. The result is a collaborative effort that resulted in improved technology to meet DoD needs and was applicable to civilian requirements.				
Springboard Spring Board is a congressionally added effort to facilitate technology transfer from the DoD laboratories to the commercial sector in Alaska. The goal is to ensure commercial production of technology developed in DoD so it can be inserted into DoD items through the normal acquisition process. (FY 2008 Congressional add amount is modified for appropriation general provisions, including FY 2008 Sec 8025(f), 8097, and 8104.) *FY 2008 Accomplishments:* Actively promoted the DoD Small Business Innovation Research (SBIR) and Independent Research and Development (IR&D) programs to companies in Alaska and throughout the U.S. in order to help identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems. As an example, Springboard brokered a Patent License Agreement (currently in legal review) between the U.S. Army Engineer Research and Development Center's (ERDC) Construction Engineering	1.924	0.000	0.000	

Exhibit R-2a, PB 2010 Office of Secretary Of Defense RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 0400 - Research, Development, Test & Evaluation, Defense-Wide/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603942D8Z Technology Transfer	PROJECT NUMBER P942

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Research Laboratory (CERL) in Champaign, Ill and Staser Group, Anchorage, AK for the "Builder" software tool. "Builder" is one of a suite of Engineered Management Systems (EMS) developed by the Army that provide a set of integrated decision support tools for prioritizing infrastructure maintenance and report. As an example, Springboard brokered a Patent License Agreement (currently in legal review) between the U.S. Army Engineer Research and Development Center's (ERDC) Construction Engineering Research Laboratory (CERL) in Champaign, Ill and Staser Group, Anchorage, AK for the "Builder" software tool. "Builder" is one of a suite of Engineered Management Systems (EMS) developed by the Army that provide a set of integrated decision support tools for prioritizing infrastructure maintenance and report.				

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

For FY 2008: established patent license agreements (PLAs) totaling approximately 30 percent of all DOD PLAs and assist in the brokering of over 400 Cooperative Research and Development Agreements (CRADAs)

For FY 2009: establish patent license agreements (PLAs) totaling approximately 30 percent of all DOD PLAs and assist in the brokering of over 400 Cooperative Research and Development Agreements (CRADAs)

For FY 2010: establish patent license agreements (PLAs) totaling approximately 30 percent of all DOD PLAs and assist in the brokering of over 400 Cooperative Research and Development Agreements (CRADAs)

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OSD RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

May 2009

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE
RDTE, Defense Wide BA# 3	**0909999D8Z – Financing for Cancelled Account Adjustments**

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate					
P546 Financing for Cancelled Account Adjustments	4.581							

A. Mission Description and Budget Item Justification: Not applicable for this item.

C. Other Program Funding Summary: Not applicable for this item.

D. Acquisition Strategy: Not applicable for this item.

E. Performance Metrics: Not Applicable.

OSD RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

May 2009

APPROPRIATION/ BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
RDTE, Defense Wide BA# 3	**0909999D8Z – Financing for Cancelled Account Adjustments**	**P546**

COST ($ in Millions)	FY 2008 Actual	FY 2009 Estimate	FY 2010 Estimate					
Financing for Cancelled Account Adjustments	4.581							

A. Mission Description and Budget Item Justification: Not applicable for this item.

B. Accomplishments/Planned Program: Not Applicable.

C. Other Program Funding Summary: Not applicable for this item.

D. Acquisition Strategy: Not applicable for this item.

E. Major Performers: Not applicable for this item.